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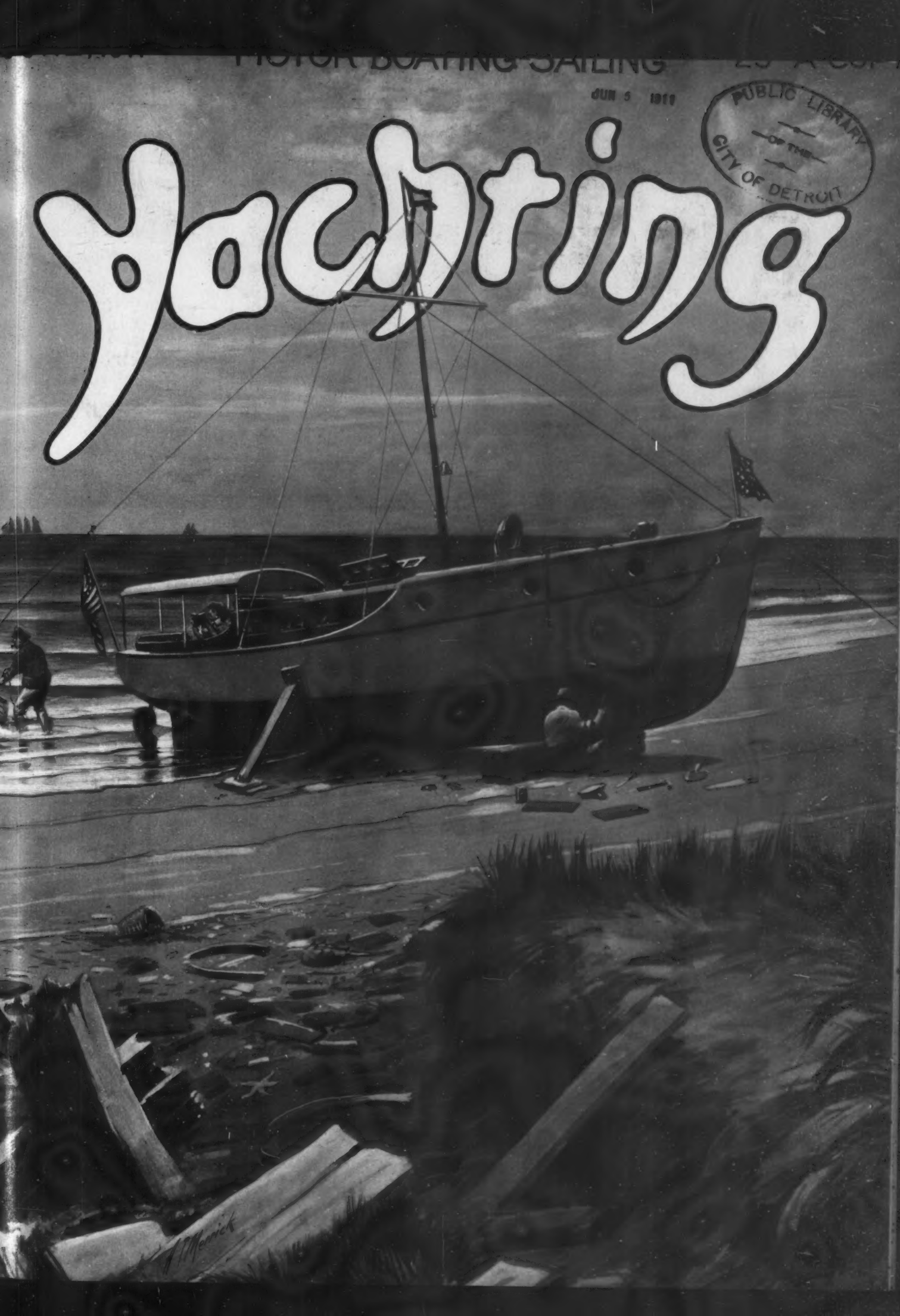

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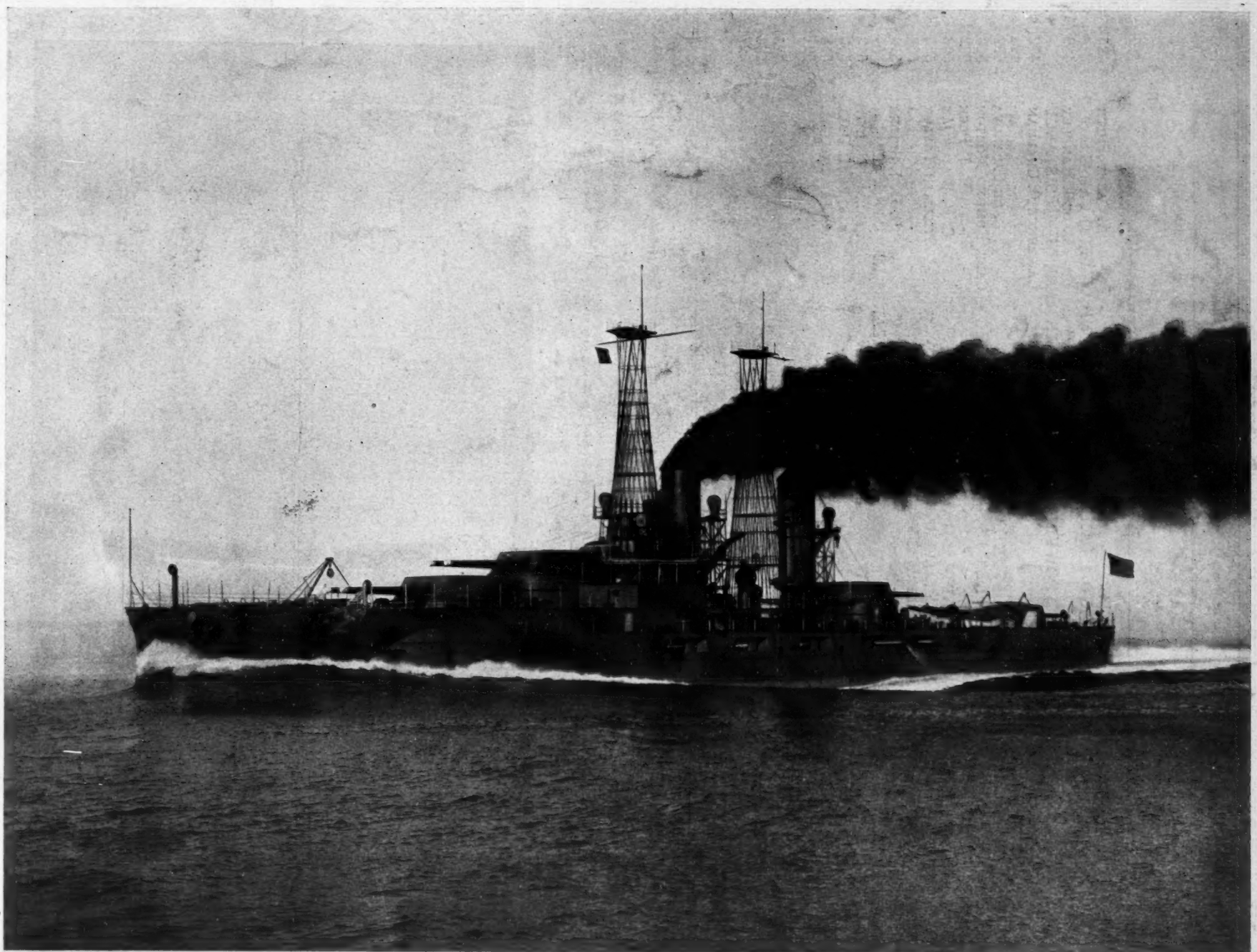

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A STUDY IN WAVE FORMATION. U. S. S. DAKOTA AT FULL SPEED.

(See article page 492)

YACHTING

VOLUME IX NUMBER 6 June, 1911 25 Cents a Copy $2.00 a Year

Sailing on a Racing Schooner

by A. Cary Smith

THE START AT BRENTON REEF LIGHTSHIP.

AS there are many people who are not only interested in yachting, but who have done a great deal of sailing in small boats and yachts, yet have never been on board of a large racing schooner during a race, the following sketch will give some idea of the handling of such a craft, the routine work, and also of the innumerable emergencies and exciting situations that occur in every race.

After spending the night aboard, everyone is up early the day of the race for a look out of the companion. The sun is struggling through a dense mass of clouds. The wind is still, and the night pennants hang listlessly in the damp morning air. The water is as smooth as glass, and the yachts are lying perfectly still, some headed one way and some the other. Masts and rigging are mirrored in the water, blurred here and there by the progress of a launch going ashore to market, the waves from her wake spreading over the mirror-like water and making snaky reflections, which gradually assume their normal shapes. The smoke from the galley stove is rising straight up, and we hear "ting-ting, ting-ting" (6 o'clock), followed by a chorus of sleepy "ting-tings." Out at the fort we see a fisherman being towed out, and ashore the smoke of the drowsy city by the sea hangs like a gray pall in the air.

Newport—that is, the summer contingent—is sound asleep at this hour, but on the deck of the big schooner all is life. The race for the Astor Cup is sailed to-day, and the covers of the sails are being taken off. First the long white snake, that will develop into a jib when broken out, is pulled out of the sail locker, shouldered by the white-clad crew, carried out to the end of the bowsprit and shackled on. Then the blocks at the head and at the clew are shackled on, and the sail slowly rises to a slow, hand-over-hand pull, until it hangs in a curve from the masthead to bowsprit end. Then the halyard is belayed, and the men take hold of the three-fold purchase and sway on it until the mate sings out "belay."

It may be mentioned here that all jibs for racing vessels are set "flying"—that is, the wire stay is on the jib, there being no jib stay with hanks. The reason for this is that the radius of the bobstay and that of the bowsprit, measured from the stem, differ so little that if the bobstay gives an inch or so it lets the bowsprit up and slacks the jib. The purchase on the wire halyard compensates for this change of form, and can be set up at any time. This method came from the old English cutters when chain halyards were used. The jib must be set first, in order to have no strain on masts holding it back. It can easily be imagined what this strain is when the vessel is sailed hard in a sea way.

Next the forestaysail is set up in stops, with the sheets in place ready for use at a moment's notice. Then the stops are taken off the mainsail, the blocks are fitted to the bridles, care being taken that the halyards are fair and clear, and two gangs of men haul away at the falls. Other men stand aft on the sail to put in the battens as the pockets are uncovered. There are sometimes five of these battens, and they must be put in as the sail goes up, or, if left in the sail, they must be inspected as the sail goes up, to be sure that they are in place properly.

When the throat is nearly up the order is given, "Set up the lifts." This is to take the weight of the boom off the sail so that it can be set properly. The throat halyard is belayed, and throat "jig" comes next. The crew go to the other side of the mast and "tail-on" to the purchase. The mate shakes the luff rope until it is taut, and, when the sail lifts the boom at the gooseneck, sings out, "Belay." Then the peak is hove up and belayed and peak "jig" comes. When the peak is well up and the sail has deep wrinkles in it, "Belay." Seven bells sounds, the red pennant is run up, and the crew go to breakfast.

After the crew turn out, the tender comes alongside and everything that can be spared is put aboard her, while we look with the glass and see that our principal rival is doing the same thing. The beds of the crew, all spare gear, skylights, anchors, side ladder, bags, boxes of brass polish, shoes, hand bags, spare sails, awning stanchions, and everything portable that can be spared until the race is sailed is put into the tender. So far is this thing now carried that large yachts are built expressly for racing, the owner and his guests living on board of a steam yacht.

This application of business methods to a sport presages the speedy extinction of real racing. It is easily seen that on a light day (and most races are sailed in light weather) what an advantage this is.

But this entails a tender to follow the yacht about and take on board these uncountable things, and few men care to go to this trouble, even if they do not care about the expense. This is a legacy of the races for the America's Cup. In the case of this competition it is "dog eat dog," and is perfectly allowable, as "All is fair in love and war"; but eating of the fruit of the Tree of Knowledge has had a baneful effect upon yachting. But to return to our mutton.

After breakfast we go on deck to find them setting the club topsail. The halyards—wire—are just long enough to reach the yard when held up. They are shackled on, the sheets are bent on the club, and up she goes. A man is on the masthead to keep the point of the yard clear while the crew hoist away. At last the yard is nearly up, the men stretch along for the last pull, and the man aloft sings out, "Chock up." All this time the sheet is being hauled out to keep it clear—one man on the sheet proper and another on the inner sheet. The man aloft gets in a bos'un's chair and is hoisted up to lash the heel of the yard to the topmast. When done, "Haul out on the sheet," is heard, the mate sings out, "That's well." "Inner sheet; that's well," and then, "Outer sheet"—this a light wire from the outer end of the club, about 10 feet beyond the gaff, and rove through a block on the end of the main boom. "That's well" follows, and the club topsail is set.

Then the foresail is set in the same manner as the mainsail. Following this the light sails are hauled out from the sail locker. It should be explained here that it is the custom when light sails are taken in to have them stretched fore and aft on the deck and carefully rolled up and tied with twine or stops. They are then coiled away in the sail locker, each one with its head left where it can be seen, the name of the sail being always marked on the head. On race day these sails are taken from the sail locker, the main saloon hatch is taken off, and these sails are put into the main saloon, so that each can be passed up when needed. It may be well to state that when racing no skylights are carried, the hatches being made of light pine wood, just strong enough for the men to stand upon when handling the vessel.

The order is then given to get the anchor. As the chain comes in the mate stands at the bow and the men pump away. "Hove short, sir," comes aft.

"Crotch tackle to starboard, let go port. Jib sheet to port. Break her out." The anchor comes up, and, as it clears the water, comes "Break out the jib." With a mighty heave on the sheet the stops break and down falls the jib; it fills, and she comes off slowly. "Let go crotch tackle, slack main sheet. Hold him. Let go jib sheet. Trim to leeward—not too flat," and away we go. The anchor is washed off, gotten on deck and taken aft and secured, the chain being handed along the deck and payed down on the ballast. The halyards are coiled up and payed down below through an opening in the deck for that purpose.

"Ship the lug sheet leaders!" The fairleaders and cleats are put in place, the purchases laid out, as well as the leaders and purchases for the forestaysail.

Now we round the fort and see the fleet in a long procession bound for the lightship. No attempt is made to make the vessel sail, and everyone sits and lounges about in that catlike manner common to a well-drilled crew. Steam yachts pass, gay with flags, and ladies' white dresses flutter here and there and men stand near them in faultless attire. These are "fair women and brave men" who go down to the sea in ships at Newport. Few of them appear on the yachts. "Why, really, my dear fellow," etc.

The clang of the bell buoy is heard as we pass that beautiful lighthouse, built of native stone. Off to the westward the surf is churning away at the gray rocks of Beaver Tail, and we see the fleet bobbing about near the lightship—catboats, motor boats, and craft of all kinds. The splendidly appointed steam yachts roll about in a dignified manner with a supercilious air, as if they knew that it cost about $500 per day to keep them in their present efficient state. Near one is a Greek lobster boat, the whole outfit of which represents, in the aggregate, possibly $25. As the sunburnt descendant of Agamemnon, who rows with his back to the stern, looks up, he murmurs, "Applepie bomi-nos," or words to that effect.

As we work out to the lightship the captain begins to look occupied. He takes the glass and looks out to sea, marks the far-off coasters, and is thinking how he shall start. He only has two boats to fear, but one of them is the latest creation of the Wizard of Bristol and belongs to a veteran who spares neither money nor time, and comes to the line as fit as a fiddle.

When we get near the ship we hear the preliminary whistle, and all becomes life aboard. "Break out the forestays'l!" and as the order is executed the captain thinks over what he shall do. The wind is rather light, the signal says Block Island course, and the wind and tide tell him that the first tack will be along the coast to the eastward.

It is an interesting time. We see our competitors sailing about with their jibs to windward in an apparently aimless fashion, and can note the effect of the tension of racing. The moment the warning whistle is given all rules of the road are strictly enforced, and boats on the port tack *must* give way to those on the starboard tack. This rule has come down from the time square-rigged ships were in vogue. With the ship, the starboard corner of the courses—the sails next the deck—is called the starboard tack, and when this tack is set up on the forecastle head, or on the cathead, the vessel is on the starboard tack; or, in sea phrase, the starboard tack is aboard. This tack has the right of way under all circumstances.

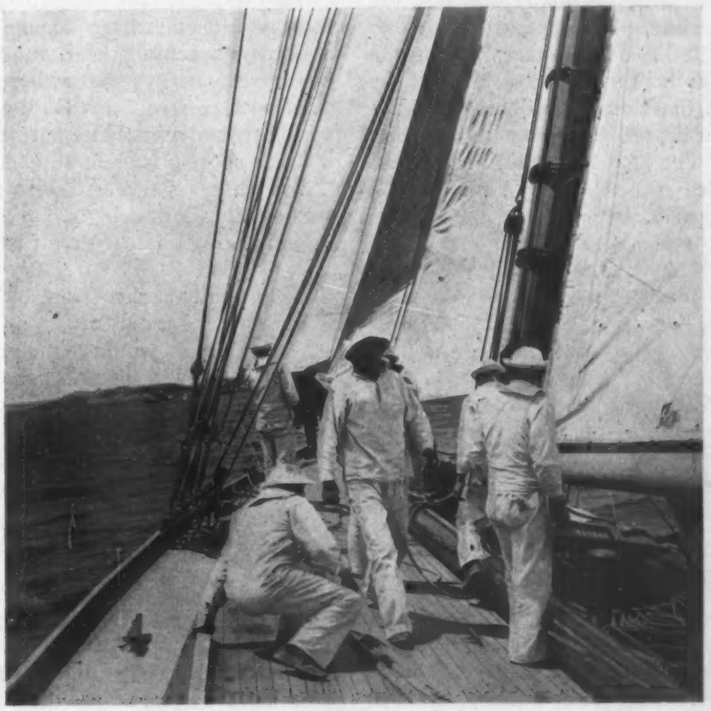
We see the yachts apparently paying no attention to where they are going, some looking as if they were not going to race at all. I have seen men, under the strain of racing, get so far from the mark that the whistle was not heard, only the steam being seen. This aberration of mind has lost many races, the yacht not getting back in time for the start and having to cross the line after the starting time had elapsed.

The smaller classes at last break out their light sails and go across the line in a bunch. The start is called a one-gun start—that is, all must try and get across the line as near to the time that the gun is fired as possible, and not a second before it, or a recall is sure to come.

After what appears to be a long time the orders are given in rapid succession: "Draw away jib." "Trim lug sheet." "When we jibe, get that main sheet flat in." "Bend on the baby." Men jump to the hatch at the last order, pull the sail out, and three men run forward and out on the bowsprit with it, where it is snapped on the stay as fast as two men can work, while others hoist away as fast as the sail is bent on. The mate sings out, "That's high; get on the tack purchase." The sail is then pulled down until the

stay is as taut as wire can be made. Then the men lay aft, and the captain sings out, "Set the fore topsail." Men jump to the halyards, the mate watches and calls, "That's high; tack him down." The tack is taken to the winch at the mast and the men heave away till the mate sings out, "That's well. Sheet him out." The wire sheet is taken to the other side of the winch and the sail is set as flat as a drum head. We are now heading for the line. "Break out the baby!" The men give a mighty pull at the sheet and the twine stops fly and the sail falls. "Not too flat with that sheet!" During all this the timer is counting the time, "Four minutes to go—three—two." The wind drops suddenly. "One minute—50 seconds—45 seconds—40—35—30—20—15—10—5." We cannot get there. A sharp order is given, "Set the staysail!" Men jump, and the sail is bent on like magic. "Hoist away forward. Easy aft. Belay forward!" Men hook the purchase on the after halyard. "Sweat him up! Break her out!"

We see our hated rival, who had wisely stayed near the mark, jibe around on his heel close to leeward of the lightship—the weather end of the mark—with everything trimmed to a hair, and in this way gets a good start of us, and we have to allow him time, too. Well! Well!



"THE JIB FILLS AND SHE COMES OFF SLOWLY."

Now we begin to see what boat-sailing means. One man crawls about the deck and looks at all the sails and then comes aft and confers with the captain in a low tone. Not a word is spoken; we hear the hum of the wind in the taut wire aloft, and the lap, lap of the water as it goes past the side. The captain stands to leeward of the wheel and handles it like a master playing the violin—how little he moves the spokes—being completely lost in his art. The sails are just full and no more, and he watches the compass with one eye and the competing yachts with the other, his gaze roaming about looking for wind. There is quite a roll on, and we know that the enemy does not like this too well.

The captain keeps her rap full and lets her foot. Sailors always speak of their boat as if she was alive. To the adept the yacht is more like a wife than a boat. No layman has the slightest idea of the closeness of the relationship between a favorite boat and her captain. Last year the captain of the Elmina stood at the wheel for 23¾ hours, without meat or drink, on the way from the Vineyard to Portland, and told the writer "Not a sea came aboard, but there was quite some spray," though a looker-on at Portland said the mainsail was wet nearly half-way up. Part of the way the Elmina only had her mainsail and jib set. With the wind from 25 to 40 miles an hour, she can carry topsails and baby. Think what a sea there must have been that dreary night when the wind went through all the clothes that a "tenderfoot" could put on! Pardon this digression—she took a rank sheer that time.

We begin to forge ahead and slowly draw past our chief rival. He is to windward, though, but we are walking through his lee in fine style, and will soon be able to tack and get very near him—or her. But we stand well on, and look as if we were a long way ahead. The other boat took another route when she saw we were taken up with our man, and has made great headway. At last comes "Clew up the fore topsail. Stand by for stays. Set up that lee runner as she goes round!"

All wake up and jump about like monkeys. One gang takes the big foresail, one hand lets go the lee sheet, the rest pull like mad on the other sheet as she comes about.

The blocks stick a moment at the mast and then bang about in a way to make men keep clear. The sheet is hauled down, and men jump onto the purchase and heave away. The sail trimmer stands by and sings out, "Give it to him! Once more! Belay!" Then you hear, "Slack that jib a bit—so! Get on to forestaysail purchase! That's well!" Then a look to leeward, holding on to a shroud, and "Slack jib topsail a bit—so!" The men at the foretopsail in the meantime had gotten their sail tacked down and sheeted out, and all hands lie down again.

Now we will soon see where we will come out. We begin to think that we will come very close to him, but at sea it is difficult to judge of these matters. For one thing, we are now in the trough of the sea, while our adversary is digging into it, head on. We take the glass and find it hard to keep it on the boat. We stand on and make a long stretch. The men see that we have cut down the lead of one of our opponents, but the other has weathered out so much while we were footing through his lee that it is a question if we will turn ahead of him.

The wind has increased to a good sailing breeze, and we can see old, gray Block Island plainly. What a desolate-looking place it looks like! What must it be in the winter, when the wind is N. E. and a blinding snow storm is raging? Again the sharp command, "Clew up the foretopsail; stand by for stays!" and all commands follow as we get on the other tack. We begin to see the mark clearly—a raft with a flashing cone on it that turns one way and then the other with the motion of the sea, throwing a brilliant flash at each turn. We stand on, and now the captain is looking over his shoulder to see how far we must go to reach the mark—just far enough and no more. The tide must be allowed for, and also the chance of wind shifting. At last comes, "Clew up the foretopsail. Stand by for stays," etc.

As we range up we hear, "Get that spinnaker pole out—port side. Get the balloon jib topsail forward, ready to bend. Balloon main topmast staysail, ready."

The spinnaker pole is 62 feet long. It is lifted up; as many men as can get hold of it pass it forward and lay it down clear of all gear. "Get spinnaker ready!" A gang pulls the sail out of the saloon and lays it forward near the foremast, one man bending on the halyard. We find we are just far enough ahead to get around the mark before our chief opponent, while the other is seen heading for the mark. We find ourselves in a bunch of

sloops, and it looks as if we could not escape a foul. But the captain stands on, and just before reaching the mark comes "Clew up foretopsail!" The sail flutters in the wind. "Take in the staysail!" Round we swing, just clearing the mark. Then orders come like a rapid-fire gun. "Take up the lee runner. Slack mainsheet—let him run. Hold him! Get that spinnaker pole out." The pole is shipped. "Haul aft on after guy. Slack fore guy. Hold! Get that foresail over. Slack up sheets. Slack jib a bit. Hoist away spinnaker." Up goes the sail, and the halyard is swayed up. Haul out!" Out she goes to the boom end. "Break him out!" All hands pull on the sheet. Boom! She blossoms out and up goes the pole a bit. "Slack that sheet. Set balloon jib topsail." While that sail is being bent on, "Set balloon staysail. Hoist away forward; easy aft. Get him up taut." Men get the purchase on the after halyard and swig him up. "Haul out sheet!"—the big sail falls and fills. "Break out jib topsail. Slack sheet a bit. Let jib and forestaysail run down." The big jib is gathered up and stops put on it, ready to set again.

As we leave the outer mark the wind gradually dies out, the spinnaker droops, and the wind is gone. The captain looks off to port steadily, picks up a glass and takes a long stare, holding the wheel with his knee. The smaller boats are ahead, and all the racers are barely moving through the water. Suddenly the captain sings out, "Let spinnaker run in; put a stop around it; haul aft main sheet and fore sheet." The boat luffs, and at once we feel the wind more, and slowly leave the fleet. "What does he mean?" is the thought of everyone. For answer the captain points to a coaster.

As we reach over we feel the new wind, and again keep off, and the order is, "Stand by for a jibe." At once the main sheet comes in, all sheets are trimmed, over goes the big boom, and away we go, with the new wind sending us along, while the fleet off to starboard are lying with drooping sails. "Spinnaker to starboard!" Up goes the pole. "Set spinnaker!" Out she goes. We are now passing the fleet and coming nearer to their course every minute. When we get near, "Stand by for a jibe!" In comes the boom and up goes the spinnaker pole, and sail is set and trimmed like a flash.

Then we slide away, leaving the line of the fleet and passing everything. Suddenly the captain sings out, "Stand by for a jibe!" and the manœuvre is repeated. By this time we are near the lower mark and make a fine turn, leading our adversary by 10 minutes. Then we haul up and have a close reach home. We do well for a while, but the wind drops and comes ahead. "Take in reaching jib topsail. Set the baby. Fore sheet a pull; jib sheet a bit."

Now we slow down, and soon the wind is hardly perceptible. The fleet is widely scattered, some on one tack and some on another. The water is just like oil. We fan along, all the crew in the lee waist, to make the sails draw. The windward topping lift is set up a trifle to take the weight of the main boom. The baby is taken in and the "reacher" set. The jib is run down. The small staysail is set. Everything is done that can be done to make her go. We stand inshore, where we see a "cat's-paw," but when we reach the place the wind is gone. After a long pull, with everyone trying to keep still, the tension becomes terrible. Nothing tries men's nerves like this.

At last the captain sings out, "Take in the 'reacher' and set the balloon jib topsail. Take in staysail and set the big one."

With these sails sedulously tended like a sandbagger, we fan along, and at last cross the line and hear the welcome "toot" of the committee boat. Each man feels as if a load was lifted off his back. The "after gang" congratulates the captain; and here let me warn you, gentle reader, how you shake hands when men have been under such a tension for so many hours—don't wear rings on such days.

Now we keep off and slack up sheets and slowly make for the harbor. The "after gang" go below and take some liquid refreshments and light cigars, pipes and cigarettes. The talk begins, and many yarns come forth. On deck the men are busy making up light sails and putting them away. At last we pass the fort and luff up in the cove, and the anchor is let go.

For the benefit of those who would be *persona grata* on a large racing schooner, the following "Don'ts" should be committed to memory:

Don't wear resounding garments.

Don't sport prismatic hose.

Don't wear sleeveless shirts; they are an abomination in the eyes of all sailormen.

Don't bring on board a kit bag like a cow's belly with a handle to it.

Don't point at other boats and make remarks about the wind.

Don't smoke coffin nails.

Don't say you would like a cocktail.

Don't pick out a place in the shade.

Don't be afraid to sit on the wet deck.

Don't sit near the wheel.

Don't touch gear that you know nothing about.

Don't speak if there is a mixup.

Don't speak to the captain.

Don't be too free with the booze when you go to lunch—if there is any.

Don't be too free with the booze after the race.

Don't be afraid to tail on the main sheet or other gear that you understand.

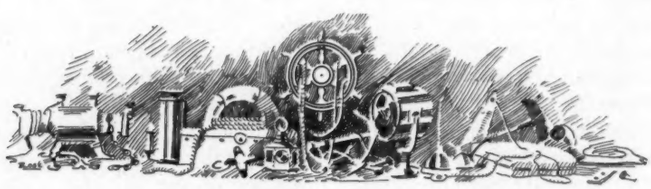
Don't forget what Count Considine said to Charley O'Malley: "All men are equal before the pistol." The same is true race day.

Don't forget to shake hands with the captain and tell him how you have enjoyed the day.

Don't forget that he has won the race, if it has been won.

Don't forget that he has forgotten more than you will ever know.

If these precepts are followed you will get the "glad hand" from the owner and the respect of the crew, not to mention many days of keen sport in the future.



From New York to the Thousand Islands by the Erie and Oswego Canals

By L. deB. HANDLEY

THE smart little 40-foot launch Princess looked every inch her name when we first caught sight of her at the Morris Heights dock. Her graceful sides shone with the glint of white enamel, her brass sparkled in the sunlight, and through the daintily curtained windows of her dark-wood cabin house one caught glimpses of artistic, even luxurious, fittings.

The owner, J. H. Smith, Jr., our host, had preceded us on board, and we found him giving the finishing touches to the compact, business-like, Twentieth-Century, 15-horsepower engine upon which we relied to carry us on the long trip to the Thousand Islands. He welcomed us to our comfortable quarters, and then, while we slipped into working togs, he assigned us to our various duties as chef, assistant chef, assistant engineer and deck hand, he himself assuming the arduous rôle of captain, navigator and engineer.

We cast off shortly after three o'clock, and, half an hour later, we had passed out of the muddy Harlem, through Spuyten Duyvel creek, and were chugging along at an 11-mile clip up the majestic Hudson. Aided by a favoring tide, we made Rockland Lake Light before six, with 32 miles to our credit, and here the skipper decided to put up for the night. We anchored well inshore, and had started preparations for dinner when a terrific bombardment seemed to shake the very earth and a shower of rocks fell about us, reminding us forcibly and most unpleasantly that the blasting of the Palisades is by no means a thing of the past. How we escaped being wrecked only the gods know. As it was, only a few small pieces hit us and they did no damage.

PRINCESS AT ANCHOR BACK OF CROTON POINT.

By the time dinner had been served dark clouds were massing in the skies and a nasty wind was shooting across the water in angry puffs. A falling glass told us we were in for a storm, and, as conditions all pointed to a hard blow, we left our unsheltered anchorage for a snug berth across the river under the lee of Croton Point. We had hardly dropped the hook again when a man's-size squall let loose with fiendish fury, and we were glad we had moved. Until far into the night the gale-driven downpour whipped against the windows, as if bent on breaking through, and it was to the sound of this torrent that we fell asleep.

Bright sunshine greeted our awakening, and I never looked upon a more beautiful or peaceful scene than that unfolded before us. It was one of those days that invited one to stretch lazily on deck, feeling glad just to be alive, and we were ready to do it justice; but the skipper knew too well the propensities of his crew, and he hustled us to work. By 8 o'clock breakfast was over, the dishes washed, and we were off. The engine buzzed all morning without a whimper and took us to Newburgh before one o'clock. Proceeding after lunch, we passed Poughkeepsie at 4:30, and anchored off Esopus Island about six o'clock, to take a swim in the inviting water. Then on to Turkey Point for dinner. Here it was decided to test the skill of our assistant chef, and we let him cook. That we survived the experiment was due more to abnormally strong digestive organs on our part than to lack of murderous endeavor on his. The food was awful, and it was unanimously voted to lower him to the rank of deck hand. And, to complete the ignominy of it, the former deck hand was raised to the position of mate, above him. Unluckily, it seemed to be just what he wanted.

We had meant to push on after dark and make a record run of it, but the engine prooved peevish and protested sullenly at night work. The skipper had to reason and coax and threaten and curse before it would yield so much as an explosion. When it finally gave in it was so late that we went no further than Saugerties creek, where we tied up at a dock, having logged 71 miles.

The captain spent the early hours of the next morning in close communion with the restive motor, and, as a result, it resumed its duties without a murmur when time came to start at 8:30. He blamed all the trouble to the air valve. Passing Malden at 9:50, we paused long enough to stock up with ice, then went on through Catskill and Hudson, reaching Albany at 2:30, after a run of 41 miles. By this time it had begun to rain, and we tied up at the Albany Yacht Club, with an afternoon of rest before us. It cleared towards evening, and all hands went ashore for a square meal at the Ten Eyck, ending with a short visit to the capital. Having secured a fresh supply of meat, vegetables and gasolene the following morning, the journey was resumed at 11 a. m. About three miles above Albany, and approximately half-way between Albany and Troy, on the westerly side of the river, lies the entrance to the Erie Canal. The only visible sign of it as one sails up is some masonry work, not easily distinguishable at a distance. The opening itself is not uncovered until one is abreast of it. The skipper knew this, so we followed the shore closely and had no difficulty in finding the turning point. Rounding then to port, we reached the first lock, No. 1, at 12:30.

We found it the best plan in going through the locks to land three men—two to handle the bow and stern lines and the third to stave off the launch with the boat hook when the inrushing water threatened to throw it against the sides of the lock. Also, we learned the necessity—if one wishes to have any paint left on the hull by the end of the trip—of hanging out a close row of fenders along the entire length of the boat. If your supply is small, emergency ones can be built in a few minutes by taking a couple of handfuls of brush and covering them, sack-like, with a piece of cloth or canvas, tied at the top.

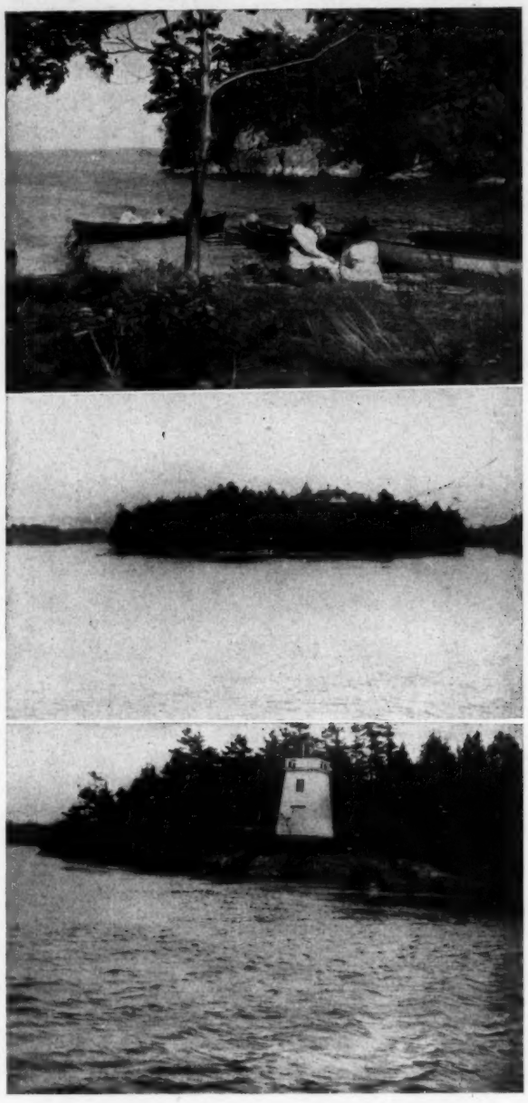
At the first lock we were asked for the permit, without which no craft can enter the canal. Such a permit can be obtained beforehand by writing to the Superintendent of Canals, at Albany. In applying, mention should be made of the route one expects to

follow, and of the size, type and particulars of one's boat. A speed limit of 4 miles an hour is rigidly enforced in the Erie Canal. A telephone system enables the keepers to ascertain to a nicety the speed averaged between locks, and, as there is no way of escaping capture, woe to the culprit. You are also compelled to respect the right of way. Yachts and fast-moving craft are shown no favoritism. It is a case of first come, first served, and it does no good to race by a leader at the last moment, because the boat coming first within a certain distance of the lock is given precedence. After going through Locks 1 and 2 we had to stop at the clearance office to take out clearance papers to Syracuse. It was then one o'clock, so we had lunch before going on. The locks that followed came in quick succession, and by 3:05 we had left No. 8 behind us. Then the engine again declared a strike, owing to unwillingness on the part of the batteries to work overtime, and the engineer settled the difference without arbitration by connecting a new set and discharging the old. At 3:50 we entered Lock 9, and everything went smoothly until we had cleared No. 18, at 5:05 and covered about 4 miles of the 9-mile stretch beyond. Then the engine protested again, and, investigation having showed the skipper that the magneto brushes needed repairing, he ordered another stop. Of course, we tied up on the side away from the tow-path, in order to be out of the route of traffic; and the assistant navigator, who had stepped ashore previously for a little exercise, found himself on the wrong side of the canal. When the rest threatened to lengthen indefinitely he got tired of waiting, so jumped into the water, clothes and all, and swam over to the boat.

At 7 o'clock the magneto's demands had been satisfied and we partook of a hasty meal, resuming the trip half an hour later. By 8:15 we had found a convenient dock near Bridge 41, and here we tied up for the night, having made 12 miles in all. It was glorious, inspiring moonlight on deck, and, with banjo tinkling, the voices of the quintet rose in glad harmony—but not for long. Soon the busy mosquitos began to buzz and bite, until slapping and cursing became an obbligato accompaniment to the music. The little pests eventually drove us into the cabin, where we hoped to smudge them out with perfectos and strong pipes. Vain hopes! They reveled in the smoke-laden atmosphere and nearly drove us mad. There was no sleeping after lights went out, and we welcomed the dawn that gave us an excuse for getting up.

Starting at 8:30, we soon passed Locks 19 and 20. Beside the latter is a picturesque little town, and curiosity led the skipper to ask its name of the lock keeper. He pondered for a few minutes, scratching reflectively at his stubble-clad chin while gazing into space, and then relieved himself of the very enlightening reply: "I don't really know what the h—— you would call it." Contrary to our custom, we refrained from asking any more impertinent questions.

At 10:30, having cleared through Lock 22, we stopped at Rexford Flats for supplies and refreshments, then went on to Schenectady, passing it at 11:45, and on through Locks 23 to 27 to Amsterdam, which we reached at 3:05. Here the crew wanted to go ashore again, but the skipper put the veto on it, and we kept moving until we had left Lock 30 behind and were within a short distance of Sprakers. Then a vicious rain and wind storm struck us, and, as it was 6:15, we tied up and made snug, having covered 44 miles in the 10 hours of running.



A QUIET COVE AMONG THE ISLANDS.
AN ISLAND ON THE DIVIDING LINE BETWEEN THE UNITED STATES AND CANADA.
A LIGHTHOUSE AT THE THOUSAND ISLANDS.

The rain cooled the atmosphere and drove away the mosquitos, so we rested well and slept late, making up for the loss of the previous night. When we awoke bright sunshine flooded the scenery and the air was clean and bracing. We ate a big breakfast and got under way at 9 o'clock, reaching Lock 31 ten minutes later. Beyond, we came to Cohen's Store, and stopped long enough to get supplies, then on to Canajoharie. Nothing occurred to upset our well-regulated routine until 5:30. We had by then cleared twelve more locks and were nearing Ilion, when the inlet valve went wrong. A short seance with a wrench adjusted the trouble. Before reaching Lock 44 we overhauled the launch Rex, and the two of us went through Locks 44 and 45 together. After clearing Lock 45 we stopped for dinner, and had intended pressing on to Utica; but at Utica Park the skipper was prevailed upon to stop and let us see it, so we concluded the day there, having covered 48 miles.

We went on to Utica in the morning, where we stocked up with fresh meat and set out at 9:30, entering Lock 46 at 9:50. A couple of hours later we overtook a jam of boats that barred our way, and, finding we could not pass, we tied up and ate lunch, resuming the trip at one o'clock. Soon the country became swampy, and when we came to an unusually promising pond near Durhamville the idea of frogs' legs suggested itself to the chef, and nothing would do but we must go after some. We organized an expedition under his guidance and hunted for an hour, but had to return empty-handed, crestfallen, and very wet and muddy. An hour more took us to Canastota, and before seven we had made Bolivar—fourteen miles from Syracuse—where we sought quarters for the night, after a run of 48 miles.

An early start on the morrow enabled us to reach Tremain's Landing at 8 o'clock, and not far beyond the chef once more saw likely territory and mentioned frogs' legs. This time all but the mate pointed the finger of scorn at him. The two were persistent, however, and so we gave them the ship's arms—a small rifle and

LEAVING ONE OF THE LOCKS.

RENEWING THE SUPPLY OF GASOLENE.

a revolver—and let them go. And then a great fusillade took place, and every shot brought peals of laughter from us. But we didn't laugh last. The foragers came back with the nicest mess of fat frogs I have ever seen, and when our "cordon blue" had prepared them for lunch we had to doff our caps to him. They were delicious.

At the hunters' return we cast off, and by 10:40 Lock 49 was astern and we entered Syracuse, where we had to secure our clearance papers for Oswego. Soon after we found the junction of the Erie and Oswego Canals, and, turning up the latter, we were at the first lock in half an hour. Five minutes later we came to the double lock—2 and 3—and, having stopped beyond it for lunch, we proceeded to Lock 4, which passed us from the canal into the Oswego River.

It may be well to remark here, for anyone who has the same trip in sight, that the Oswego Canal runs in and out of the river, and that nearly every lock is marked by sudden drops in the river bed, over which the water falls in little cascades. Some of these drops are treacherous; they hardly make any noise, and there is no warning of their approach. In running at night one is in constant danger from them, and even in daytime it is well to be careful. The fact that six boats are known to have been wrecked in the past year by going over the falls will best tell how necessary is caution. Navigators should favor the right (easterly) side of the river and inquire at each lock the distance to the next, that they may be ready to locate it. Avoid hugging the shore too closely, though, for the canal is not properly taken care of, and there grows along its sides a quantity of grass that winds around the propeller and causes no end of trouble. After passing Locks 4, 5 and 6 we reached Ox Creek and anchored for the night.

We were off at 8:30 on the morrow, and nothing eventful happened until after Lock 9, when the boat began to crawl at a snail's pace, and the captain—knowing the locality—asked the mate to jump overboard and inspect the propeller. The submarine artist found so much grass wound around the blades that it took him some 10 minutes to clear it away.

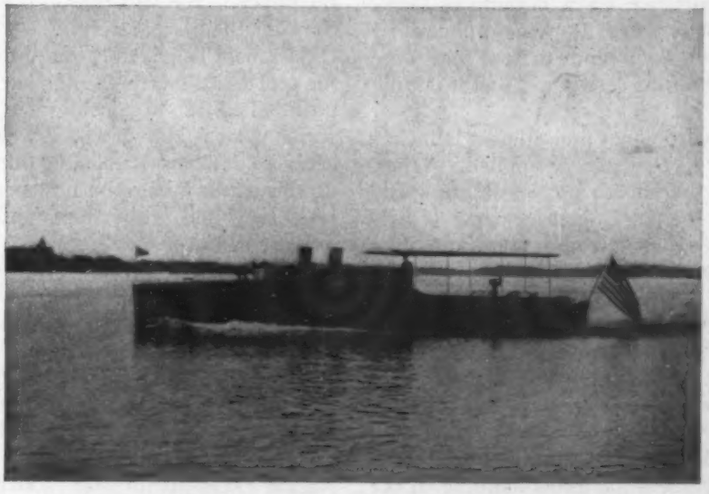
Between Docks 12 and 13 is a dam across the river. By 11:50 we had placed behind us the last lock No. 19, and 10 minutes later we sailed through Oswego and found the mouth of the river. We turned to port, and noon found us moored off the Oswego Yacht Club.

The distance from Oswego to Clayton is 66 miles, and the course leads one well out into Lake Ontario. When we landed at the yacht club on Monday and mentioned making the crossing without a pilot, they threw up their hands in horror. Then they sent a local pilot to impress on us the awful dangers of the trip. We listened patiently and politely to the man's pointed remarks on our inexperience and presumption—then started without him. It may be added, however, that the trip is not a safe one, and that unless you have a really good navigator on board it is prudent to get a local expert to take you across. Part of the course is off as ugly a nest of rocks as ever threatened mariner. This is between Oswego and Galloon Island. The place bears the gruesome name of Dead Man's Cove, and not without good reason, for many lives have been lost there. If it blows fresh out of the N. W. a nasty sea hits one on the beam, and it is very easy to be thrown off your course into dangerous waters.

Conditions were bad when we reached the open. The breeze had been N. W. all night, and we found a heavy and choppy cross-swell running. Our compass course to Galloon Island was N. by E. ¼ E, but to allow for leeway the skipper headed N ¾ E, and, as later events proved, made a correct estimate.

We weighed anchor at 9 o'clock, and by 10 we had lost sight of land. The water got rougher and rougher as the wind increased, and a falling barometer gave us considerable uneasiness; but the little ship behaved splendidly, and all fears were laid at rest when Galloon Island was sighted off

(Continued on page 558.)



MUSCALONGE. ONE OF THE BOATS PASSED ON OUR WAY TO CLAYTON.

The Resistance, Propulsion and Powering of Motor Boats

By LAWRENCE B. CHAPMAN

Junior Member of Society of Naval Architects and Marine Engineers

PART I—RESISTANCE

IT is my purpose in these articles to take up the subject of resistance, screw propulsion and power as applied in naval architecture and apply them as simply as possible to the motor boat. Nothing new will be undertaken, nor any new theories proposed, but the well-known laws will be treated so as to be understood by the motor boatman. All mathematical work and formulæ will be eliminated as much as possible, but considerable thought and study will be needed for the proper mastering of the subject.

Very often we see a boat driven way beyond her natural speed or driven at a disadvantageous speed, and the owner wasting his money trying to get an extra mile out of her; or we see another boat at a great disadvantage because she is fitted with a wrong propeller. It is for just such reasons as these, and because nothing has been written on this subject within the grasp of yachtsmen, that I am undertaking these articles on the subject.

The first thing I want to touch on is the subject of hydroplanes. Many men with fast launches think they have broken all laws of resistance, and believe that, though these laws may hold for ships, they do not hold for small boats. This is due to the fact that a few men who, though they may have heard of the laws of resistance, know nothing of them, decry them when some hydroplane goes at some unheard-of speed. It is getting to be a common occurrence to hear that some new hydroplane has smashed the laws of resistance, and it is time matters were straightened out.

Let me say at the outset that hydroplanes and all fast launches obey the laws of resistance as far as they can be applied. When we say that the power varies as the fourth power of the speed we mean for the same boat and the same displacement. Obviously, if the displacement is changed the law no longer holds, for the fundamental principle of all laws of resistance is that the displacement must remain the same. Now it is known that at high speeds the hydroplane leaves the water and skims on the surface and decreases her displacement. One of the first laws of naval architecture is that a boat displaces her own weight of water. If the hydroplane rises on the surface and decreases her displacement, how can we justify the law? A better way to state the law is that the downward force (weight) must be equal to the upward force (buoyancy). With this statement the understanding of the hydroplane is simple.

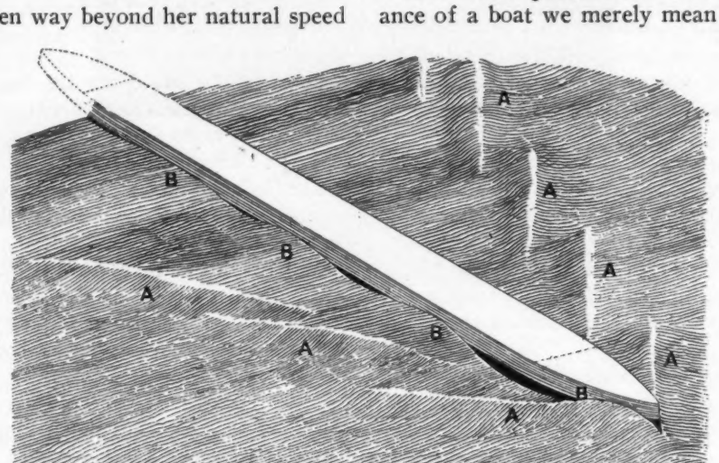


FIG. I.—A, DIVERGING CRESTS. B, TRANSVERSE CRESTS.

Hydroplanes are driven at very high speeds in proportion to their length, and their bottoms are so constructed with step-like planes that as the speed increases these planes slap the water, as it were, and the reaction of this slapping action causes the boat to rise and so decreases her displacement. Thus we have the reaction plus the upward force or buoyancy equal to the downward force or weight. This is not the full explanation of the action of a hydroplane, but is complete enough for our present purpose.

Let us now proceed to the study of resistance. By the resistance of a boat we merely mean the force necessary to drive her at a certain speed. Resistance expressed in pounds is the same as the tow-line pull if the boat were towed at that speed. When we take up the subject of propulsion we will see that the resistance differs slightly from the tow-line pull, due to certain actions of the propeller. It should be remembered throughout this article that resistance and power are the same thing differently expressed. Speeds will be expressed throughout the article in knots, which are 6,080 feet, or 1.15 times the statute mile.

The resistance of a boat may be divided into four kinds—namely, (1) frictional resistance, (2) eddy-making resistance, (3) stream line resistance, (4) wave-making resistance. We will now proceed to take these up in order and consider them separately.

As a boat is driven through the water the water in contact with the hull tends to stick to the surface and is dragged along by the boat. This sets a considerable quantity of water in motion and forms what is known as the wake, which can be seen as a broken layer of bubbles streaming out behind the boat. This rubbing of the water along the hull constitutes what is called frictional resistance, and is the same resistance as that caused by rubbing any two surfaces together.

I will give no formula for frictional resistance. It is sufficient to say that frictional resistance varies nearly as the square of the speed and as the area and nature of the wetted surface. Obviously the cleaner and smoother the bottom, the faster the boat. It should be clear to all that a boat covered with barnacles or with any sort of rough bottom would get a better hold on the water, so to speak, and retard the speed of the boat considerably. So also the greater the wetted surface, the greater the friction. Recent experiments with models with hollow waterlines forward have proved that there is no increase of speed, but that the speed

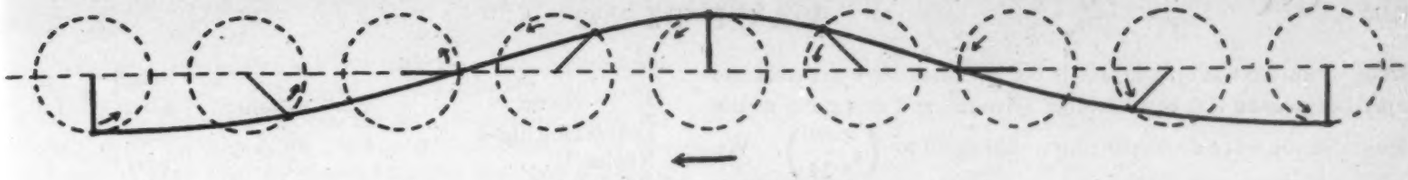


FIG. 2.—THEORY OF WAVE MOTION.

is slightly slower, due, no doubt, to the increased wetted surface caused by hollow lines.

We said frictional resistance varied nearly as the square of the speed. By this we mean that a boat making 10 knots will have four times the frictional resistance of the same boat making 5 knots; that is, when the speed is doubled the frictional resistance is increased four times.

We will next take up eddy-making resistance. This form of resistance plays but a small part in the resistance of well designed boats, and is generally neglected in all computations for resistance. It is the resistance caused by eddies formed by blunt bows and sterns. Most of us have seen the whirling eddies formed before and behind square-end barges. In this case nearly the whole resistance to be overcome by the tug is eddy-making resistance. The same thing occurs on a smaller scale at the sternposts of motor boats. Most boatmen are sure to have the bows quite sharp, but not all are careful to fair away the sternposts, rudders, etc.

To reduce this form of resistance to a minimum it is necessary that sternposts, rudders, under-water exhausts, and the like should be well faired. In some short and wide boats eddies may form amidships. If a boat has a full stern, eddies may form behind the boat, and not only retard the speed but cause erratic steering.

Another form of resistance which should have brief mention is stream-like resistance. By a stream-line is meant the path of a particle of water passing along the hull. The form of these stream lines has been pretty well determined by experiment on models. These stream lines tend to take certain forms and cause resistance if caused to depart from these forms. The form of submarines with blunt bows and sterns was chosen because it is the form that stream lines take, and, consequently, they have no stream-line resistance. Many mathematical and theoretical works have been written on this subject and all lead to the same result—that the stream-line resistance for a well designed boat is practically negligible.

I once saw a boat which had an under-water exhaust supposed to be of great merit. A pipe led from well forward near the keel to well out on the boat's bottom amidships, leading diagonally across the bottom. While the pipe increased the frictional resistance but little, it caused considerable stream-like resistance by causing the particles of water along the hull to depart from their natural path. Care should be given to such things as these, as they reduce the speed more than one would think.

We now come to the most interesting and most important part of our study of resistance — namely, wave-making resistance. This form of resistance plays very little part in the resistance at low speeds, but is extremely important in boats driven at all above their natural limits, as most motor boats are. All boats which move through the water are accompanied by a system of waves, which are maintained by the power which propels the boat. There are two systems of waves, a bow system and a stern system. Part of the waves are divergent and part are transverse. Fig. 1 illustrates the waves accompanying a boat. The transverse (B) and diverging crests (A) are well shown. This sketch, which is taken from a paper by Froude, is worthy of careful study.

Before taking up the general topic it will be interesting to spend a moment in the study of waves in general. Waves are supposed to take the form of a curve called a trochoid, and the wave motion is formed by particles revolving in circular orbits, Fig. 2. There is no forward motion of the water, but the particles revolving cause the up-and-down motion, as will be seen by a little study of the figure. All waves of the sea do not necessarily follow this form, as there are many influencing conditions and several forms of waves found. The waves which accompany a boat take this form and follow all the mathematical laws of the trochoidal wave. Various laws can be deduced regarding the time, length, speed and height at which a wave breaks. The only one of direct interest is that the speed of the wave in knots can be expressed by the formula $V = 1.34\sqrt{\text{length}}$, where the length is the distance from crest to crest.

The laws governing wave-making resistance are more or less complicated and will not be given here, as they would only lead to confusion. I will simply state how this form of resistance varies and give a few illustrations.

We saw that at low speeds, where the major portion of the resistance is frictional, the resistance varied as the square of the speed. As the speed is further and further increased wave-making resistance begins to play an important part, until at extreme speeds it is the major part of the resistance. The resistance varies as the third, fourth and even as the fifth power of the speed as the speed is increased. Thus, if a boat is driven at an extreme speed (say 25 knots), and it is desired to increase the speed to 29 knots, we would have to more than double the power to obtain it. Thus, for 4 knots, or 16 per cent. increase of speed, the power is doubled because of the great influence of wave-making resistance.

A common error among boat owners is to believe that doubling the power will double the speed, but a little consideration of the way the power varies with the speed will show them their error. The power to drive a 16-20-knot boat at half speed is only from one-sixth to one-eighth the power necessary at full speed. A little study of some of the accompanying curves will show how the resistance varies with increase in speed.

We will now turn our attention to the important subject of wave interference. The speed of the waves set up by a boat must have the same speed as the boat, or otherwise the boat would run

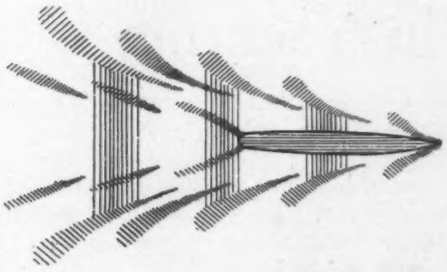


FIG. 3.—WAVES ACCOMPANYING AN 83-FOOT BOAT AT 9 KNOTS SPEED.

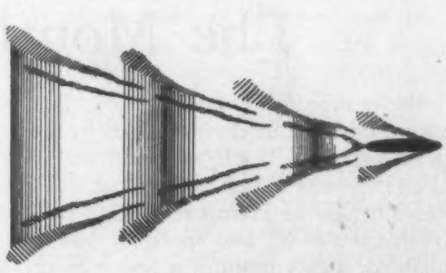


FIG. 4.—THE SAME BOAT GOING AT 18 KNOTS.

away from the waves, and this is not the case. We saw that the speed of a wave was equal to 1.34 $\sqrt{\text{length}}$, and this gives us the length of the wave accompanying a ship equal to $\left(\frac{\text{speed}}{1.34}\right)^2$. We also saw that there were two systems of waves, a bow system and a stern system. The distance between the first bow crest and the first stern crest is slightly greater than the length of the boat. The first bow crest is about a quarter wave length from the stem and the first stern crest about the same distance aft of the stern-post. This position varies somewhat, due to the form of the boat. Fig. 4 shows the waves accompanying an 83-foot launch going at 18 knots. The transverse and diverging crests are well shown. The second crest of the bow wave is astern of the boat. The shading indicates the crest. A computation carried through, using the above formula, shows the exact position of the second bow crest. Fig. 3 shows the same boat going at 9 knots, and in this case the second bow crest is about amidship.

Bearing these facts in mind, we find a boat going at 9 knots is accompanied by waves of the same speed, with a distance between crests of 45 feet. If the boat is 90 feet long, three crests will be formed along the hull. A boat going 7 knots, which is about 8 miles, will have an accompanying wave of 27½ feet from crest to crest. Now if this boat is in the neighborhood of 24 feet in length, the second crest of the bow wave will be on top of the first crest of the stern wave. This is what is called wave interference, and the power required at the speed where interference takes place will be considerably more than required for a slightly less or greater speed.

If the speed is slow for the length of the boat, the fourth bow crest might be on top of the first stern crest, and as the speed increases interference of the third and second bow crests takes place with the first stern crest. These points of interference cause "humps" in the speed resistance curve, and can be seen in any curve of a model test. If a boat is driven at a speed beyond the place where the interference of the second bow crest takes place, the second bow crest goes further and further aft and the wave resistance does not increase as fast as before. If a hollow of the bow wave comes at the position of the stern crest, the result is a very small wave, and this is the speed to drive a boat, if possible. A boat should never be driven at a speed where the speed divided by the square root of the length equals 1.025 or 1.48, for these are the worst cases of wave interference. Thus, a 46-foot boat should never be driven at 10 knots, nor a 36-foot boat at 9 knots, and so on.

The ratio of speed divided by the square root of the length is a measure of the speed of the boat. All values above 1.48 are free from wave interference, and most motorboats are driven beyond this value.

The following table gives the length, speed and speed ÷ square root of length for a few of the fastest motor boats. By length in all this discussion is meant waterline length:

Name	Length	Speed Knots	Speed $\sqrt{\text{Length}}$
Legro-Hotchkiss	39′ 3″	29.6	4.73
Napier II	40′	25.0	3.95
Quicksilver	30′	18.2	3.32
Wolesley-Siddeley	39′ 4″	30.4	4.85
Dixie II	39′ 6″	31.3	4.94
Irene	39′ 8″	25.7	4.08

Large ships hardly ever run into these critical speeds. Thus, the Lusitania, 800 feet long, runs at 26 knots, while the critical speed does not come until 30 knots.

The study of waves in shallow water is a very important subject in the resistance of ships, and will be of passing interest to the motor boatman. As a boat goes into shallow water followed by a train of waves, the energy is transmitted to a shallower body of water and the particles revolve faster, the orbits of the particles changing from circles to ellipses and the height increases. On account of this increased height the waves are liable to break. This is the cause of waves breaking in shallow water on a rough day. The effect is observed as a motor boat runs into shallow water; the waves rise up to a considerable height, often breaking, and the speed of the boat is diminished. It was proved in trials of certain British destroyers that the speed was increased 2 knots in passing from 50 to 100 feet of water, and a further increase of 1 knot was obtained in a depth of 240 feet. We thus see that the depth of water does play a part in the resistance.

On the other hand, the speed may be considerably increased in shallow water. As a boat goes into shallower and shallower water the length of the waves increases until at a certain depth the train of waves is reduced to a single wave, known as the solitary wave. The law of resistance suddenly changes at this point and the increase of speed is only slight for large increases in power. As the depth is further decreased the speed is such that the solitary wave cannot keep up with the boat, and the boat runs on with practically no waves. Experiments with models and torpedo boats show these points beautifully. The depth at which this critical change in resistance takes place can be expressed by $\frac{(\text{speed})^2}{10}$, and this depth should be avoided. Perhaps some of the readers have noticed this phenomenon when going into shallow water at high speeds.

The limit of this article will not allow of any analytical discussion of resistance, but from the foregoing we see that the two main resistances encountered by a boat are frictional at low speeds and frictional and wave-making resistances at high speeds, while eddy-making and stream-line resistances can be neglected in well designed boats. Certain other forms of resistance come in, due to the action of the propeller, and will be discussed in the next issue under the head of "Propulsion."

The Month in Yachting

EVERYBODY has the hydroplane craze just now, due, no doubt, to the impetus this type of craft received by the International Race of last year. First we heard that Peter Pan IV—a new Peter Pan IV—was to be a hydroplane, designed to sweep everything before her in the Harmsworth Cup races on Huntington Bay. Now this is denied, and we learn that she is a 26-foot mahogany runabout, with a beam of 4 feet 9 inches, to be driven by a 40-horsepower motor. She will seek trophies in handicap events. Then, a week or so ago, we began to hear excited whispers that three wonderful hydroplanes were building up on the Harlem River—in secret—craft designed to defeat anything in the way of a fast boat afloat. Everybody who could breezed up along the tempestuous—and muddy—Harlem, only to learn that while the boats are to be hydroplanes they will make but modest pretensions as world-beaters.

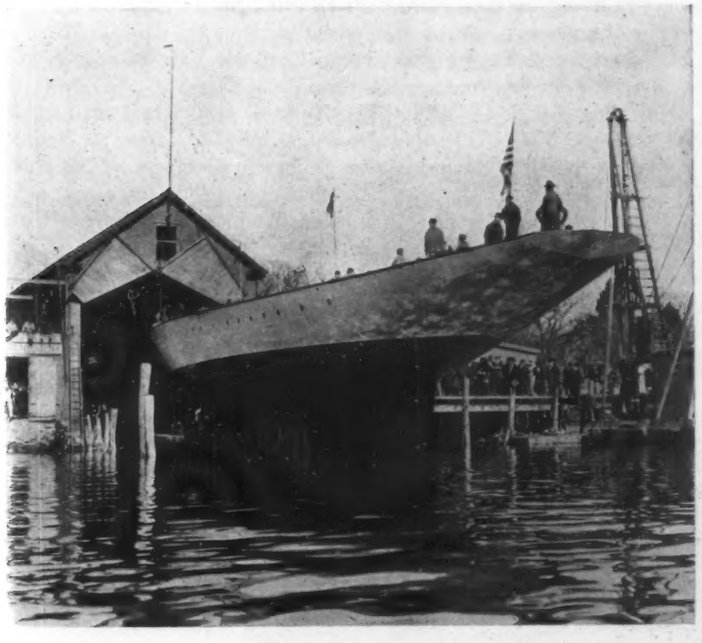
Out on the Ohio River Edward Henshaw, of College Hill, Ohio, has had built a small boat, 20 feet long by 3 feet 6 inches beam, with a view of testing out a motor recently designed for

hydroplanes. The engine for this little craft was built by the Dean Manufacturing Company, of Newport, Ky. The hull is built to the limit of lightness, the bottom planking being but one-eighth of an inch thick. While this is drawing the line on lightness very fine, we understand that the boat is only a trial boat to test out the new engine. This is well, for if the Foxy Quiller ever strikes a small snag or any object of respectable heft she will go apart like Pompeiian glass. The engine of the Foxy Quiller is a four-cylinder, 3½ by 3½, developing 1,400 revolutions a minute. With her motor of 24 horsepower she made the remarkable speed of 26.7 miles an hour, and before they are through with her—or before she hits something—it is expected that she will hit up 30 miles. This with an engine of such low horsepower would be nothing short of unprecedented. The hull weighs only 150 pounds and the engine the same, making but 300 pounds for the entire outfit. In her trial, they say, fully two-thirds of the boat was out of water. Well, here's success to her! Yet at the same time I cannot refrain from putting in a plea for the well-constructed craft. I had a friend who would be alive to-day if he had been content with sane methods in construction. And, again, I don't believe that there is any consistent progress along freak lines. Foxy Quiller will be seen at Huntington Bay in September—maybe!

A witty motor boatman called in at Nock's yards, at East Greenwich, the other day and found so much activity as to make him gasp. Over seventy-five yachts had wintered there, and the yard hummed with preparations to put them in commission. Then there was a new 75-foot cruising motor boat approaching completion, and boats of various types, also, for a number of well-known yachtsmen.

"Well, well," exclaimed this motor boatman, viewing all this hurly burly; "this is certainly the first time I ever saw a good Nock turned into a boost." (P. S.—Knock!)

Commodore Melville has again showed his calibre by devising the idea of requesting the government to send two torpedo boats to accompany the boats which are to enter in the Motor Boat Club of America's race to Bermuda. As Commodore Melville says, the Government has allowed its naval vessels to escort aeroplanes and America's Cup races, and that certainly there is no good reason why the Bermuda Cup race should not be similarly honored. I cannot see why not myself. If this annual feature is of any value in the development of seaworthy motor boats and good sailors, then surely the government should offer every possible assistance.



SCHOONER ELENA TAKING HER MAIDEN PLUNGE.

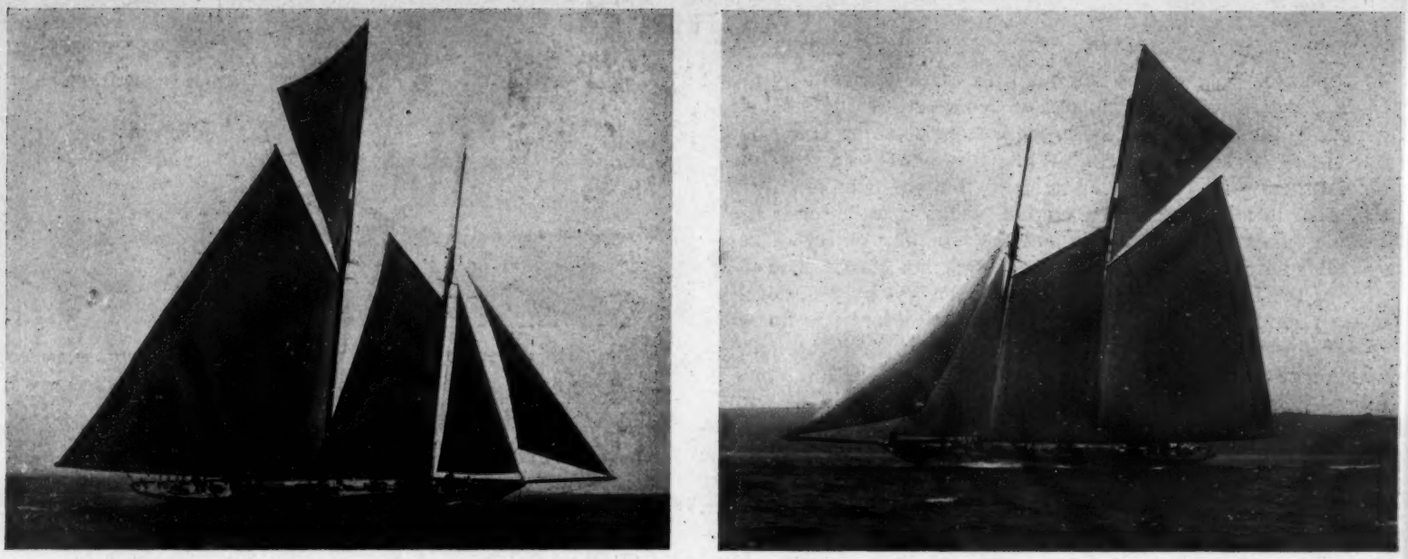
FOXY QUILLER, A 20-FOOT SPEED BOAT ON THE OHIO RIVER, WHICH RECENTLY MADE 26.7 MILES PER HOUR WITH A 24-HORSEPOWER ENGINE.

On the other hand, I do not see that the torpedo boats would be of any help to render assistance to the competing craft in case of necessity. In a race of this kind the boats are sure to be widely scattered, and if the torpedo boats kept up with the van they would be far from the laggards, and vice versa. If an ordinary motor boat is not capable of going to Bermuda without a convoy then she had better stay in port, for this race was designed to encourage seaworthy boats and not speed craft, which might reasonably look for a breakdown over such a course. I do not think that the certainty of a naval escort would have any effect in inducing weak-kneed yachtsmen to venture off soundings.

I understand that at least six entrants are already assured for this race, which is a great many more than usually are assured at this season of the year or later. Four of these possibilities, or rather probabilities, are Sybilla II, building at Camden, N. J. (Mathis Yacht Building Company), for J. F. Botz, of Philadelphia; a new boat building for A. W. Teele, of New York; Caliph, owned by Commodore M. E. Brigham, of the Ventnor Yacht Club (this yacht won the Atlantic City-Havana Return Race last year), and Eronel II, owned by Vice-Commodore Samuel Cochrane, of the Bensonhurst Yacht Club (winner of last year's Bermuda race).

Speaking of torpedo boats reminds me of the time last spring when the naval reserve of a certain State set out from one of the Southern navy yards. The boat was an old one, but in pretty good condition. Below the Virginia Capes the hooker ran into a "snorter" and was making beastly weather of it. Wild calls for help were sent along the coast and finally reached the Charleston yard, whence a tug was sent to the assistance of the distressed reserves. They arrived in time to see the craft pitching just outside the breakers. Of a sudden the naval reserve commander, who found the proximity of land too alluring to resist, shoved his gig overside in a sea which was sufficiently serious to make even the torpedo boat stand on end. And the funny part of it was that the gig made shore right side up with care. The torpedo boat came around all right and everyone had a good laugh save the commander, who stood on the beach watching the craft he had so proudly commanded, claw out to sea.

Good racing starts early this season—windjammer racing, I mean. The Indian Harbor Yacht Club is to repeat its annual affair—the cruise race to New London—where the yachtsmen will view the Yale-Harvard boat race. This race of the Greenwich organization is always one of the most delightful of the season. After the college events the larger boats of the cruising contingent will participate in the Eastern Yacht Club's race from New London to Marblehead for the Commodore Clark Cup. In this race the Karina, Atlantic, Enchantress, Taormina, Irolita



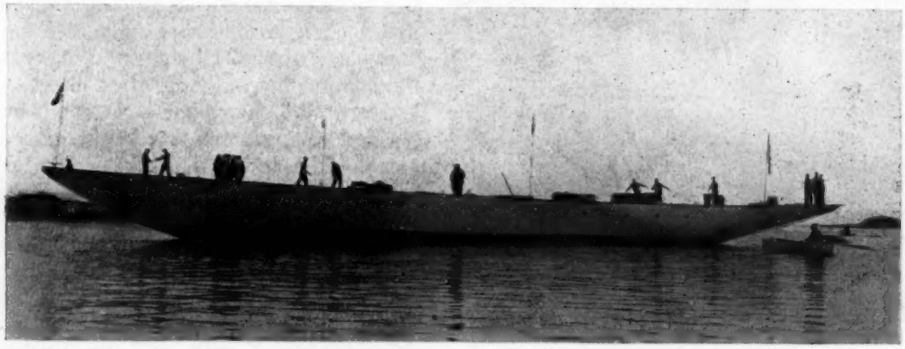
THE NEW PLANT SCHOONER ELENA ON HER TRIAL SPIN.

(formerly Queen), and possibly the Elena, will meet. The smaller boats of the Indian Harbor cruising fleet will race from New London to Oyster Bay under the auspices of the Seawanhaka-Corinthian Yacht Club. In all, we read good team work among the clubs, a fact which, if consistently followed out, will do much to revive the old-time interest in sailing races.

It is certain, for one thing, that not in past years has there been a season with so much in store for those who love to see canvas-driven boats race. Karina, Irolita, Elena, Enchantress and Westward make a wonderful galaxy, and the effect on the sport in general of a season of racing among these yachts will be nothing short of dynamic. Capt. Christiansen and a crew of men, by the way, are preparing to bring Westward to this country. Of course, she will try for the trans-Atlantic record, and there are good chances of her success—at least so one newspaper states. But it sounds fishy to me. She will in all probability be nursed over in order to have her in the best possible condition for racing here. Capt. Dennis, I learn, is highly elated over the news of the Westward homecoming, and is rushing work aboard Elena, full of confidence that this new craft of Commodore Plant's will wrest from the proud bowsprit of the Cochran fore-and-after the laurels which she gathered in such profusion abroad. Well, Westward will not have Charley Barr. Wonder how much that means in terms of speed? Elena has been launched and tried out, and the photographs we reproduce herewith give a good idea of the new boat, both her underwater body and under sail.

Shimna, the fast 55-foot sloop, is for sale. The Herreshoffs took her back from Morton F. Plant in part payment for Elena, and they are going to put her in racing trim. Who will buy? Eh?

Joint club cruises seem to be in order this year, and several clubs have scheduled their week's cruise in conjunction with other clubs in the vicinity. This is a good thing, as it fosters a friendlier spirit among the clubs and brings the yachtsmen of the various organizations into closer touch with each other. On Long Island Sound I understand that the New Rochelle Yacht Club has sent an invitation to various other clubs on the Sound, such as the Harlem, Knickerbocker, Northport, etc., to participate in its annual event and to choose the same date and course. Some of the clubs on the Massachusetts coast have also done the same, and the Scripps Endurance cruise on the Great Lakes should amount to practically the same thing.



THE NEW PLANT SCHOONER ELENA AFTER LEAVING THE WAYS.

The Put-in-Bay meet of the Inter-Lake Yachting Association, which has come to be the classic regatta of the lower lakes, promises to be the most successful of any which that association has held for a number of years. The dates chosen are from July 17 to 21, inclusive. In addition to the races for sailing craft, the Inter-Lake Yachting Association has put a great deal of effort to getting together a representative lot of high-speed power boats, with a view to making the meet as attractive to the power boat men as to the sailing men. With this in view, the Inter-Lake Power Boat Committee has raised over $1,500 in prize money for the two days of racing. All events in the speed boat class will be scratch races, and there will be prizes for the 26, 32 and 40-foot classes. There are no entry fees, no strings on the cup, and no restrictions, excepting over-all length, the first boat home winning the money. Some of the best boats of the Middle West will be seen there, among them being Cero II, Van Blerck, Hoosier Boy, two new 26-footers—one for W. E. Scripps, of Detroit, and the other for J. G. Willett, of Buffalo—and Craftsman, of the Lakewood Y. C. There is also a possibility of James A. Pugh, of Chicago, sending down his new Fauber hydroplane. Commodore A. Y. Gowan, of Cleveland, is chairman of the race committee. For the sailing men there will be racing in the usual classes, with a lot of fine silver cups.

The Motor Boat Club of America will handle the Marblehead Race this year, and the course will be from Huntington, L. I., to Marblehead, a distance of practically 240 nautical miles. The event is open to cruising boats not less than 30 and not over 40 feet over-all length, with a waterline beam of not less than one-fifth of the waterline. The start will be July 14.

A GROUP OF MODELS OF YACHTS OWNED AT VARIOUS TIMES BY COMMODORE H. A. MORSS, OF BOSTON.

Models, and the Making of Miniature Craft

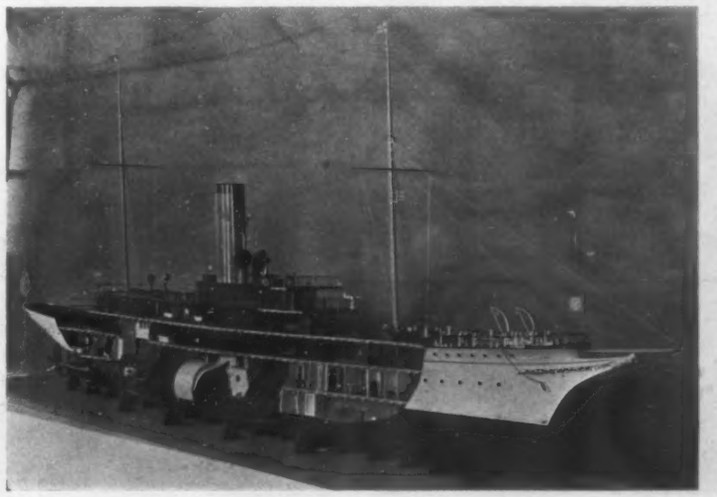
By L. de CASANOVA

Photographs by the Courtesy of the H. E. Boucher Company

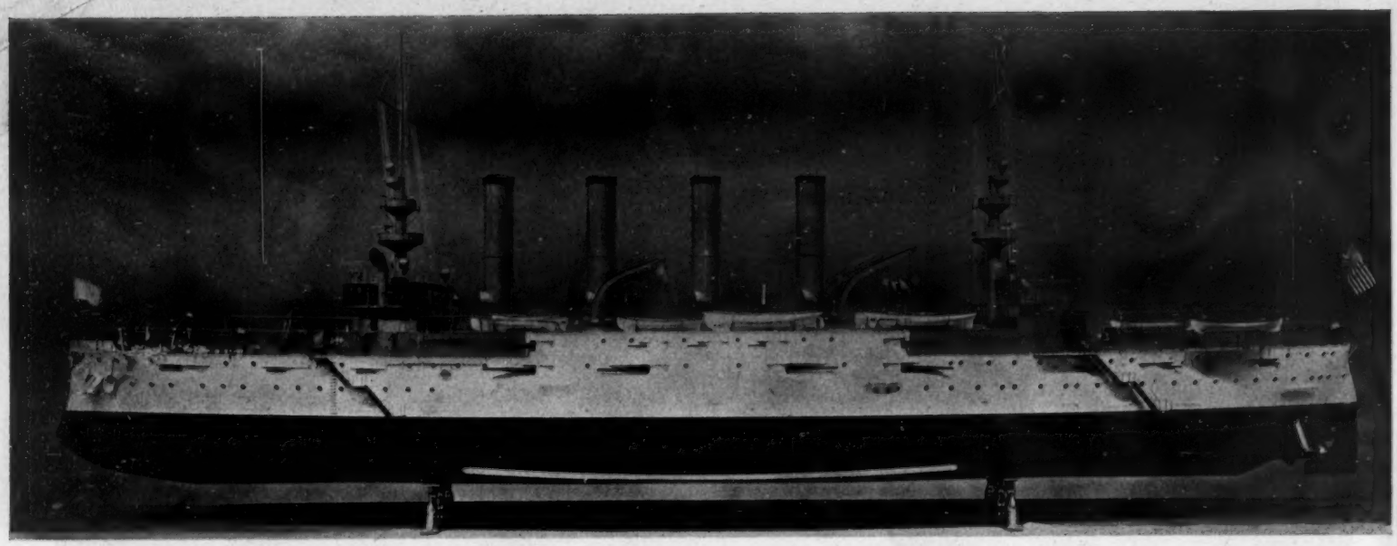
AT the quiet end of a busy city artery there may be found a tiny stationery store. It is only one of the many "curiosity shops" that dot a big city, each one to the other as one twin is to his brother. Pausing for a moment to look into the little window, there may be seen a strange collection of odds and ends. Underneath a string of highly sensational nickel shockers, that stretch across the whole width of the window and form a fringe to the drop curtain of the Liliputian bazaar below, there may be found cheap dolls, in all stages of dishabille, that lie side by side with school books and pencils. Playing cards tumble over themselves on red and black checkerboards, and baseballs and roller skates and the hundreds of other things so dear to the heart of childhood are scattered around, with a total disregard for the rules of window dressing. It is all so commonplace and cheap that nothing catches the eye, unless it is the spars of the queer little yacht that lies on its beam-ends in the darkest corner of the crowded window.

Like a beached craft on an ugly coast, the toy lies disconsolate in its dirty corner. Souvenir postal cards surge, like ocean waves, around the highly painted sides. Every sail is spread, but the canvas, once white, is now dirty and gray as a fisherman's ancient canvas. As a rule, the underbody is as strange in color as it is in lines, and almost invariably (be she sloop or schooner) the craft proudly bears the good old name Reliance.

Here lies the tiny yacht until it is spied by some youngster—some sturdy little shaver of a chap, dressed in a uniform of sailor's blue. Give him the boat, and you will see him toddle away towards the park, whose cool, green trees are seen around the corner. Follow the pair of sturdy legs, and quickly you will be led to a pond that is covered with dozens of tiny boats. Sit and watch, and you will see them sail, like wonderful argosies, to far-off lands that lie across the sea. Loaded with pebbles and bits of wood, that are diamonds and rubies and bars of gold to the youthful skippers, the craft are sent away on hazardous voyages. How bravely they dash away and how breathlessly are they watched by their youthful owners! "Strange," you say, as



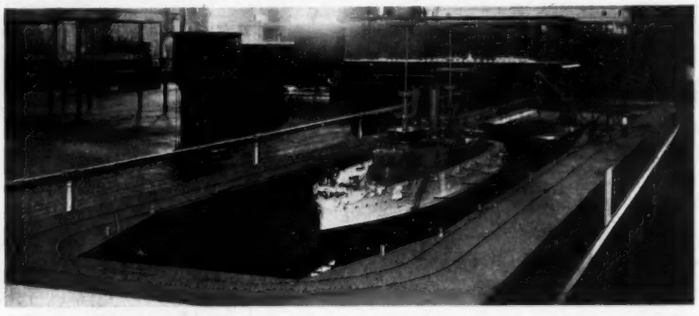
FULL SECTIONAL MODEL OF STEAM YACHT IOLANDA.



FULL MODEL OF U. S. S. ST. LOUIS.

you turn away, "how those miniature yachts escape collisions."

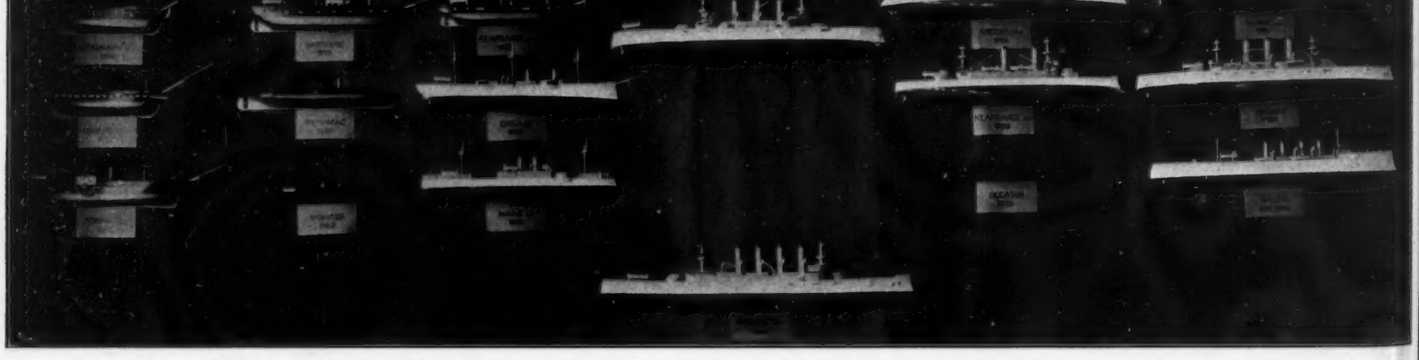
Such are miniature yachts to the average landlubber, and such, also, are miniature yachts to many who have sailed beyond the bar and who have heard the song of creaking blocks and wind-swept sails. Surprised indeed would these people be if they had the opportunity of visiting a model shipyard and of inspecting a collection of real miniature yachts.



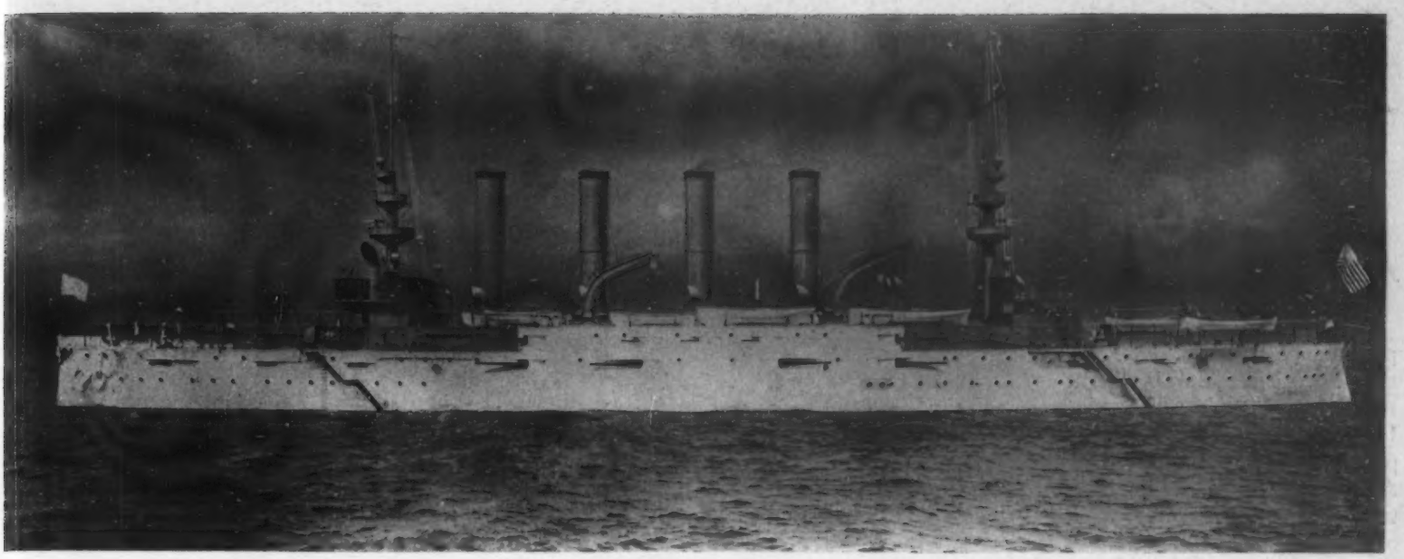
MODEL OF U. S. S. ILLINOIS IN A MODEL DRYDOCK AT THE NAVAL ACADEMY.

Models have played an important part in shipbuilding since vessels were first designed. In the earlier periods a model was used by the shipbuilder, who usually was the designer, in the way that a sculptor uses a model of a statue to develop his ideas. Later, models were used in a more mechanical manner; in fact, up to within comparatively recent years designers never thought of attempting to design a vessel until they had worked out their ideas on a block of wood. They would chisel and whittle the block until it had assumed the desired form, and then they would make their drawings from the model. The method is responsible for most of the vessels of the old navy, and even to-day there are a number of fishermen, coasting schooners and yachts, built within recent years, whose form or design was developed on a block of wood.

The method usually employed in making a model was to build a rectangular block of wood of the required size out of layers or "lifts" of even thickness. Each lift represented a waterline plane, and, as a rule, each lift was a half-inch in thickness. The lifts would be held together by wooden pins, so that they could be separated easily. On the block of wood thus formed the outline of deck and profile would be drawn, and then the designer would whittle down the block gradually until it had assumed his ideas as to form, especially the underbody. After the exact shape had been reached (and sometimes several models would be made before this was accomplished) the lifts that formed the model would be separated and the curved outline they had assumed would be traced on paper. Of course, only half models were made for this purpose, the flat side of the half model representing the center line of the craft.



MODEL OF NAVAL VESSELS GROUPED BY CLASSES AND MADE BY H. E. BOUCHER FOR THE JAMESTOWN EXPOSITION.



THE SAME MODEL AS SHOWN ON THE PRECEDING PAGE, SET IN PAINTED WATER.

From the waterline planes thus formed and transferred to paper exact dimensions could be obtained at given intervals, from which the vessel would be built. The method is sometimes called the "rule of thumb." Naval architecture developed by this means is more of an intuition, or gift, or inborn knowledge than the acquired and cultivated shipbuilding science of to-day.

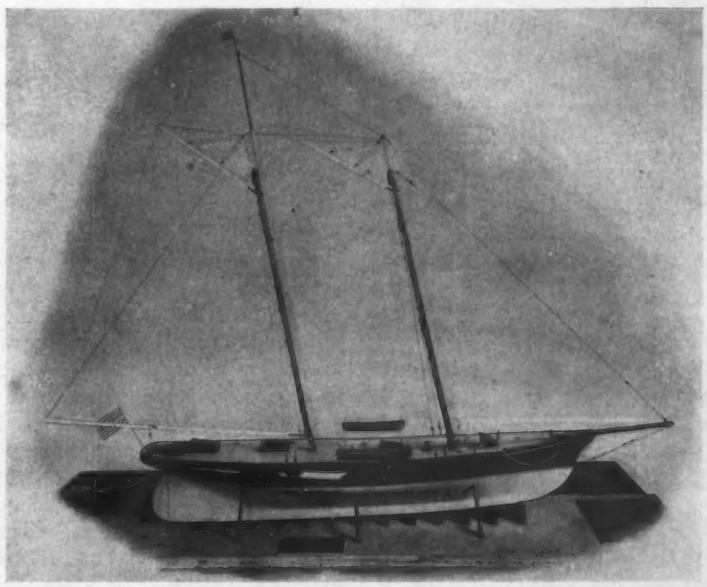
As the science of naval architecture advanced designers gradually discarded models as a means of designing vessels. The underbody, especially of commercial craft, gradually assumed an accepted form. Mathematics took the place of the "rule of thumb." As data collected from existing vessels were available, paper and pencil took the place of the wooden block.

Notwithstanding the apparent advance of the science of naval architecture, there are still several designers of prominence who invariably design boats by the means of models. It is often said that the elder Herreshoff designed by his sense of feeling, and that by passing his hand over a model the blind shipbuilder could communicate to his mind the exact shape of the full-sized vessel.

A gradual change has taken place within recent years among designers. A combination of the two systems has begun to be accepted. Plans alone, especially in the case of an important craft, have not been considered final by designers. After the drawings have been completed, there sometimes exists a doubt as to whether or not the lines show exactly the ideas of the designer. Drawings, at best, will show only projected views in length and breadth. They do not give any idea as to depth, and cannot show any quartering view. It is a known fact that the hull of a vessel is an irregular body, and can hardly be considered a geometrical result. To the shipbuilder, a half model is almost indispensable. The steel plates which form the outside shell of important craft always are "layed off" on a model, as it is impossible to obtain the exact shape of each plate by the means of a drawing. Models, therefore, are of great importance in shipbuilding to-day.

While models are of great importance to the shipbuilding industry of the country, a more interesting end in the manufacture of miniature ships and yachts is the creation of models for historical purposes. There is hardly a yacht club in the country that does not have its model room. As a rule, these miniature craft are only half models, handsomely mounted on some polished background. To the real yachtsman they are of interest, and no lover of a boat can pass through a strange model room without stopping to examine the different craft.

The New York Yacht Club, in its home on Forty-fourth Street, New York, has one of the most valuable collections of models in the world. The most coveted treasure of the exhibition is a beautiful miniature of the schooner yacht America, the historic craft that captured, in English waters, the mug for whose defense the New York Yacht Club has spent millions of dollars during the past half-century. In the collection there are models of every craft that has defended the cup, as well as practically every boat that ever has flown the well-known burgee of the organization.



MODEL OF THE FAMOUS SCHOONER AMERICA.

It is not only yacht clubs that have chosen the model for the preservation of historical craft. The Navy Department of the United States Government has a most wonderful collection of miniature battleships. These are not only kept as a matter of reference, but are used as practical object lessons for the instruction of naval officers and naval constructors. In the collection at Washington there are full models of practically all of the more important ships of war in the United States Navy. Those who have never seen the collection cannot imagine the wonderful work of the model maker. Some little idea may be gleaned regarding the perfection of his work by looking

(Continued on page 554.)

Navigation for the Amateur

A SHORT COURSE IN THE SIMPLER METHODS OF FINDING POSITION AT SEA BY OBSERVATION OF THE SUN'S ALTITUDE—THE USE OF SEXTANT AND CHRONOMETER

By CAPT. EDMUND MORTON

PART IV—THE DAY'S WORK, EQUAL ALTITUDES, EX-MERIDIANS

THE DAY'S WORK

THE navigator calculates the position of his ship as accurately as possible at noon each day at sea, finding the latitude, longitude, course and distance made from the previous noon, or from the last point of departure. It is customary to work the morning sight for longitude as soon as the observation is taken, using the latitude as found by dead reckoning. Unless the sun was on the prime vertical, or the latitude used proves to be correct, an error will occur in the longitude obtained. After the latitude is found by a meridian altitude at noon the latitude used in the morning may be corrected and the sight worked over again, in order to get the correct longitude at the time of observation.

Johnson's book, "Finding the Latitude and Longitude in Cloudy Weather," contains tables for making corrections to both latitude and longitude without working the sights over a second time, and are of great value in both shortening and simplifying the calculations for which they are intended.

To correct the error in longitude as found by the morning observation by Johnson's table, proceed as follows: Find the sun's true bearing at the time of observation from the azimuth tables (Davis' or Burdwood's), using as arguments the latitude, declination and apparent time at ship. Then with the latitude and sun's true bearing enter Johnson's Table No. 1, and find there the error in longitude caused by each minute of error in the latitude. Multiply this quantity by the number of minutes the latitude is in error, and the result is the whole correction to be applied to the longitude.

It must then be known which way (east or west) the correction is to be applied. If the sun bears S. E., put it down thus: $\frac{\text{S. E.}}{\text{N. W.}}$ Then if the correction to the latitude is north, the correction to the longitude will be east, while if the correction to the latitude is south the correction to the longitude will be west. If the sun has a different bearing, put it down, as in this case, with the opposite bearing underneath, drawing a line diagonally across from either N. or S., as is necessary. Practice in drawing the Sumner lines will make this at once apparent.

The following example will show this method more clearly. On January 17, 1911, at 8:30 a. m., ship was approximately in Lat. 26° 00′ N., Long. 74° 50′ W. Sun's observed altitude was 19° 20′. True bearing S. 52° E.

Obs. altitude....	19° 20′		
Cor.	+ 08′		
True altitude....	19° 28′		
Latitude	25° 50′	secant	.04573
Polar dist.....	110° 54′	cosecant	.02956
	2)156° 12′		
Half sum	78° 06′	cosine	9.31430
	19° 28′		
Remainder	58° 38′	sine	9.93138
			2)19.32097
			9.66049
Meridian altitude....	42° 10′ S.		
	89° 50′		
Zenith dist.....	47° 40′ N.		
Declination	20° 52′ S.		
Latitude	26° 48′ N.		
Dist. sailed N.....	38′		
Lat. 8.30 A. M.....	26° 10′		
Lat. first used.....	25° 50′		
Error in latitude....	— 20′		

Apparent time, ship.....	8h. 22m. 08s.		
Eq. time.....	0h. 9m. 59s.		
Mean time, ship.....	8h. 32m. 07s.		
Greenwich mean time.....	1h. 22m. 05s.		
Chronometer slow.....	0h. 10m. 26s.		
Cor. G. M. T.....	1h. 32m. 31s.		
Mean time, ship.....	8h. 32m. 07s.		
Long. in time.....	5h. 0m. 24s.		
Longitude .....75° 06′ W.			

From time of observation for longitude, at 8.30 A. M., to noon, ship sailed 38 miles N. 3° W.

Sun's true bearing, S. 52° E. (Davis' Az. Tables).
Error in latitude used, 0° 20′.
Correction for each minute, 0′.87 (Johnson's Table I).
20 x 0.87 = 17.40.

Sun bears $\frac{\text{S. E.}}{\text{N. W.}}$

Correction to latitude is north; therefore, correction to longitude will be east.

75° 06′ less 17′ = 74° 49′ W. corrected longitude.

Observation is now worked with the corrected latitude, proving the correction taken from Table No. 1 to be right.

Obs. altitude....	19° 20′		
Cor.	+ 08′		
True altitude....	19° 28′		
Latitude	26° 10′	secant	.04696
Polar dist.....	110° 54′	cosecant	.02956
	2)156° 32′		
Half sum.....	78° 16′	cosine	9.30826
	19° 28′		
Remainder	58° 48′	sine	9.93215
			2)19.31693
A. T. S. 8h. 23m. 15s.....			9.65846

Apparent time, ship.....	8h. 23m. 15s.
Eq. time.....	0h. 9m. 59s.
Mean time, ship.....	8h. 33m. 14s.
Chronometer time.....	1h. 22m. 05s.
Chronometer slow.....	0h. 10m. 26s.
Greenwich M. T.....	1h. 32m. 31s.
Mean time, ship.....	8h. 33m. 14s.
Long. in time.....	4h. 59m. 17s.
Longitude .....74° 49′ W.	

Using the last example, the distance made good and the course from noon to noon is calculated as follows:

Jan. 17, noon.....	Lat. 26° 48′ N.		Long. 74° 51′ W.
Jan. 16, noon.....	Lat. 22° 24′ N.		Long. 74° 36′ W.
Difference in latitude....	4° 24′	Difference in longitude.	15′

Difference of latitude = 264 miles. Difference of longitude: 15′.

Enter Table No. 2 (Bowditch) where the difference of latitude and departure are given for 24 degrees, which is the middle latitude ship has sailed in. Enter 15 in the distance column and take out 13.7 from the latitude column, which is the departure made in miles. Now seek a course in the same table, where the difference of latitude 264 and departure 13.7 will agree. They are found to nearly agree on page 372, giving a course of 3°, which is our course, N. 3° W. Distance 264 miles.

Johnson's tables are very useful in finding the latitude and longitude simultaneously by means of two chronometer sights, which are calculated without drawing any lines on the chart. The method is there explained in the plainest manner, and numerous examples are given to illustrate the use of the tables.

EQUAL ALTITUDES

A simple method of finding the longitude is by means of equal altitudes of the sun taken before and after noon. This method proves most reliable when the latitude and declination are of the same name and the sun passes near the zenith when on meridian. In such a case the sun rises and falls rapidly near the meridian, and the time can be noted accurately within a few minutes before, and again after, noon. In other cases a longer interval of time is necessary, usually from 15 to 30 minutes, in order to get good results, as in higher latitudes the sun changes its altitude very slightly when near meridian.

When the time is about as many minutes before noon as the latitude is in degrees observe an altitude of the sun and note the time by the chronometer. Clamp the instrument, keeping it set on the same altitude, or else carefully take the reading and set it exactly the same again after taking the meridian altitude for latitude. Now with the sextant already set, watch the sun after pass-

ng meridian until its lower limb again touches the horizon, carefully noting the time by chronometer. Add the times by chronometer together and divide their sum by 2, which gives Greenwich mean time. Apply the equation of time as directed in the Nautical Almanac to obtain the Greenwich apparent time. The local apparent time at ship will be 12 o'clock, noon. Therefore, the Greenwich apparent time will be the longitude at ship in time. Reduce this time to degrees and minutes by Table No. 7.

In case the ship has sailed a considerable distance north or south during the interval of time between the two observations, a correction must be applied to the altitude before taking the time after noon. If the ship has sailed toward the sun, increase the altitude as many minutes as the ship has sailed in miles. If she has sailed away from the sun, decrease the altitude in a like manner before noting the time by chronometer after noon. Here is an example:

On April 11, 1911. In latitude 34° 41′ N.

un's altitude A. M..... 63° 02′	Time by chronometer..... 4h. 32m. 16s.
un's altitude P. M..... 62° 56′	Time by chronometer..... 5h. 02m. 08s.
Ship sailed 6 miles north in interval etween observations; altitude P. M. ecreased accordingly.	2)9h. 34m. 24s.
	Greenwich mean time..... 4h. 47m. 12s.
	Chronometer slow..... 0h. 12m. 04s.
	Corrected time..... 4h. 59m. 16s.
	Equation of time..... 0h. 1m. 16s.
	Greenwich app. time..... 4h. 58m. 00s.
	Converted in longitude Table No. 7: 74° 30′ W

Monday, April 24, 1911. Equal altitudes taken near noon for ongitude:

Chron. Times.	Chron. Times.
4h. 33m. 05s. A. M. } Altitude	4h. 35m. 25s. A. M. } Altitude
5h. 10m. 55s. P. M. } 79° 55′	5h. 08m. 15s. P. M. } 80° 10′
2)9h. 44m. 00s.	2)9h. 43m. 40s.
4h. 52m. 00s.	4h. 51m. 50s.
hron. slow 0h. 12m. 57s.	Chron. slow 0h. 12m. 57s.
5h. 04m. 57s.	5h. 04m. 47s.
qua. time. 0h. 1m. 46s.	Equa. time. 0h. 1m. 46s.
ong. time 5h. 06m. 43s.=76° 40′ 45″ W.	5h. 06m. 33s.=76° 38′ 15″ W.

Chron. Times.	Chron. Times.
4h. 37m. 40s. A. M. } Altitude	4h. 42m. 00s. A. M. } Altitude
5h. 06m. 30s P. M. } 80° 20′	5h. 01m. 50s. P. M. } 80° 40′
2)9h. 44m. 10s.	2)9h. 43m. 50s.
4h. 52m. 05s.	4h. 51m. 55s.
hron. slow 0h. 12m. 57s.	Chron. slow 0h. 12m. 57s.
5h. 05m. 02s.	5h. 04m. 52s.
qua. time. 0h. 1m. 46s.	Equa. time. 0h. 1m. 46s.
ong. time 5h. 06m. 48s.=76° 42′ W.	5h. 06m. 38s.=76° 39′ 30″ W.

The examples given on April 24 are unusually good, as the conditions were favorable to use this method. The ship was within the Tropics; the declination of the sun was the same as the latitude; the sun was, therefore, rising rapidly until it reached the meridian, and then began to decrease its altitude as rapidly. The ship was sailing on a due west course, so that no corrections to the altitudes were necessary, as is the case when a ship is sailing in a north or south direction. In high latitudes the results obtained by this method are always questionable, and should not be relied upon too implicitly.

LATITUDE BY AN EX-MERIDIAN ALTITUDE OF THE SUN

When the sky is partly overcast so as to cause any doubt about obtaining an altitude of the sun on meridian, take an altitude as near noon as possible and note the time by chronometer. To the Greenwich mean time apply the equation of time as found in the Nautical Almanac, reducing it to apparent time. Then take the ship's longitude in time (which is the time of the sun's meridian passage) and subtract from it the Greenwich apparent time, as noted. The difference will be the number of minutes from noon. If a time sight has been worked in the forenoon and the local apparent time accurately known, that is sufficient, as it is only necessary to know the number of minutes before or after noon.

With the altitude observed and the interval of time from noon, the meridian altitude must be found. This can be readily taken from Tables No. 26 and 27 (Bowditch). First enter Table No. 26 with the approximate latitude and sun's declination, having regard as to whether they are both of the same name (north or south) or of different names, and take out the variation in altitude for one minute from meridian passage. Next enter Table No. 27 with the variation for one minute and the whole number of minutes from noon and find there the whole correction, which is always to be added to the observed altitude. Now, having the meridian altitude, proceed to find the latitude in the usual way.

The latitude found will be correct at the time of the observation. The distance the ship sails north or south during the interval of time from noon must be applied to find the latitude at noon. Here is an example:

On April 11, 1911, ship was approximately in Lat. 34° 40′ N., Long. 74° 30′ W. At 11h. 45s. a. m. the sun's observed altitude was 63° 02′. Time by chronometer 4h. 32m. 16s. Chronometer slow 12m. 04s. Equation of time 1m. 16s. to be subtracted from mean time. Sun's corrected declination 8° 05′ N. Required the latitude at noon.

Time by chronometer.....	4h. 32m. 16s.	Observed altitude.....	63° 02′ 00″
Chronometer slow.....	0h. 12m. 04s.	Reduction to meridian...	14′ 30″
Greenwich mean time.....	4h. 44m. 20s.	Meridian altitude.....	63° 16′ 30″
Equation of time.....	— 01m. 16s.	Correction for dip, refraction and semi-diameter.	10′ 00″
Greenwich apparent time..	4h. 43m. 04s.	True central altitude....	63° 26′ 30″
Longitude 74° 30′ W. turned into time (Table No. 7) is the Greenwich time of noon at ship....	4h. 58m. 00s.		90° 00′ 00″
		Zenith distance.....	26° 33′ 30″ N.
		Corrected declination....	8° 04′ 55″ N.
Difference equals minutes before noon.....	0h. 14m. 56s.	Lat. time of observation.	34° 38′ 25″ N.
Enter Table No. 26 with latitude 35° N. and declination 8° N.		Sailed north 3 miles.....	3′ 00″ N.
Variation of one minute 3.″6.		Latitude at noon.....	34° 41′ 25″ N.
Reduction Table No. 27 for 15 minutes = 14′ 30″.			

With one exception, the examples which have been given for both latitude and longitude were in north latitude and west longitude. The problems have been used in actual practice at sea, proving their usefulness and correctness, and are better adapted to the use of amateurs in this vicinity than positions located in the more distant parts of the globe.

If one becomes a good navigator in the North Atlantic he will be equally good in the South Atlantic. The same rules apply there as here. The latitude will be reckoned from the South Pole instead of the North Pole, and if the sun bears north from the observer, the zenith distance will be named south and the declination applied to it as the rule and common sense indicates. In the working of a chronometer sight for longitude, calculate the polar distance from the South Pole.

In finding a position in east longitude the only difference will be found in the Greenwich time, which will there be earlier than the local time at ship. When a ship leaves New York and proceeds across the Atlantic, through the Mediterranean Sea or around the Cape of Good Hope, the local time becomes nearer the Greenwich time until the meridian of Greenwich is reached, when both times would exactly agree. Proceeding farther eastward, the sun would rise at ship's position before rising at Greenwich; therefore, the time at ship would be the latest and Greenwich time the earliest.

Here is an example in South Latitude and East Longitude.

Example: On February 8, 1911, ship was approximately in Lat. 29° 55′ South, Long. 47° 00′ East. About 8 a. m. observed altitude of the sun was 33° 21′. Chronometer time 4h. 56m. 10s.,

slow 10m. 32s. Corrected equation of time 14m. 20s. to be added. Correct declination 15° 20′ South.

Obs. alt.	33° 21′		App. time, ship	8h. 00m. 42s.	
Cor.	+ 10′		Eq. of time	+ 14m. 20s.	
True alt.	33° 31′		Local M. T.	8h. 15m. 02s.	
Lat.	29° 55′	.06211			
Polar dist.	74° 40′	.01574	Chron. time	4h. 56m. 10s.	
	2)138° 06′		Chron. slow	0h. 10m. 32s.	
H. S.	69° 03′	9.55334	Greenwich M. T.	5h. 06m. 42s.	
	33° 31′				
Rem.	35° 32′	9.76431	L. M. T.	8h. 15m. 02s.	
		2)19.39560	G. M. T.	5h. 06m. 42s.	
		9.69780	Long. in T.	3h. 08m. 20s.	
			Long.	47° 05′ E.	

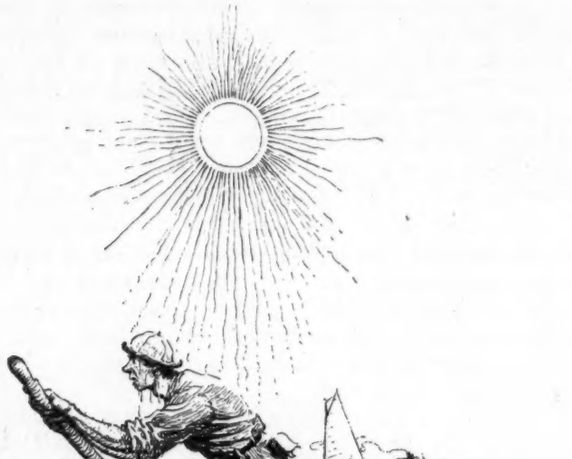
The Local Time at ship is greater than the Greenwich Time, therefore the longitude found is East.

In traveling around the world in a westerly direction a day will be lost, while in an easterly direction a day will be gained. If one traveled westward with sufficient speed to keep the sun always overhead, he would return here to-morrow without having any night and apparently the same day. If he traveled eastward with the same speed, he would meet the sun having a second day at the antipodes and a third day on arriving here to-morrow. The day begins at the 180th meridian; on one side of the line it will be Sunday, while it is Monday on the other side. Ships crossing this line to the eastward repeat one day, while ships crossing to the westward drop one day from the calendar.

(To be continued.)

The Delights of Cruising

IN the delicious canine days,
So mantled in poetic haze,
I love to go upon a cruise
In natty ducks and canvas shoes.
My craft, one of the feline tribe
(I'm careful not to let her jibe).
What joy to get besoaked with spray
While plowing through the heaving bay!



"O, hard a-lee!" I blithely shout
Whene'er I wish to come about.
The boom swings o'er when she doth tack,
Giving my head a playful crack,
And though 'tis broad and shining day,
I plainly see the Milky Way.
And if a calm chance to befall
While broiling sun shines over all,
I love to raise a white-ash breeze
And row for several miles with ease:
It fills my soul with pure delight
And gives a splendid appetite.
And if of hardtack I'm bereft,
A bight of rope is always left.
How sweet in distant ports to ride
At anchor on the evening tide:
To row ashore fresh stores to buy
Of ice-cream, cigarettes and pie,
And picture postal cards to send
Back home to my best lady friend!
How calm and restful at two bells
To seek the cabin's bilgy smells!
I bump my head upon the beams
As inspiration for sweet dreams,
And 'midst the oil-skins, blankets, butter,
Dishware, soap and such-like clutter,
Wriggle deftly from my clothes
And seek the narrow bunk's repose.
With what a soothing, drowsy hum
Mosquitoes then begin to come,
And, with consideration rare,
To gently bore me here and there!
Ah! yes. I love to cruise—and then
I love to get back home again.

HENRY J. PECK.

How to Install a Motor in a Paddling Canoe

By C. B. WATERMAN

TO one who has always been accustomed to the canoe as a paddling proposition, the suggestion that he install a motor in the seemingly frail craft has always seemed an engineering feat to be approached only by the most skillful workman, and even then in fear and trembling. The man who has sailed a canoe has used lee boards of the "strap-on" or "clamp-on" type, and there are comparatively few who have even seen a regular sailing canoe equipped with two sticks and a regular centerboard built into the hull. The canoeist who has been accustomed to the canvas-covered hull so well known throughout New England is particularly fearful of installing a motor. He looks upon that canvas as something sacred, and is as afraid of cutting a hole in it as in his own skin.

As a matter of fact, it is a simpler proposition to install a motor in a canvas-covered canoe than in the Peterboro, with its narrow planking, or the Canadian type, where the planking is wide and the seams covered with narrow half-round strips "stopped off" at the equally narrow half-round ribs. Even in these types the installation of a light engine designed for canoe use is a simple matter for anyone who can handle a saw and plane. It takes some care, to be sure, but does not require skill. And what work is there about a boat of any kind that does not require care?

Most canoeists would welcome a detachable canoe motor through fear of an installed one. As a matter of fact, a detachable motor is not suitable for a light canoe less than 18 feet in length, and on some types of hull even longer than that it is not satisfactory. A motor canoe is often thought to be dangerous; but, as a matter of fact, the installing of an engine in the most cranky canoe will promptly cure it of most of its bad habits. With a fairly broad hull, even though it may be only a 14 or a 15-footer, you can usually sit on the rail after a motor has been put in. The motor lowers the center of gravity and steadies the boat.

Now let us suppose that your canoe is resting on trestles or boxes in your boat house or workshop ready to have a motor installed, and let us follow the procedure which I have found simplest for the amateur. The first move is to locate the motor. If it is a light motor you can simply select a location towards the stern without regard to anything except the seating arrangements. Put it where it will be least in the way. With a 14 or 16-footer—which usually has two thwarts—the best location is just aft of the stern thwart with about 6 or 8 inches between this thwart and the flywheel, so that you can reach in and get a good pull at the starting crank. With the motor so located four people can crowd into a 16-footer just as easily as before the motor was installed.

Draw on the floor of the boat house a horizontal line *A-B* to represent the bottom of the canoe. This will form the base line. Next take a good-sized piece of cardboard or heavy paper, *C*, and cut out one corner, as in Fig. 1, to fit the curve of the stern, leaving some paper hanging below the keel. Next take a piece of straight-edged board, *D*, long enough to rest along 6 or 8 inches of the straight part of the bottom and still project beyond the stern. If your canoe has an outside keel the board may be held against it, otherwise it should simply be held on the bottom as near the keel line as can be determined. Holding this board in position with one hand, set your paper in position so that paper and board overlap. Then holding the two in the same relative positions by holding the overlapping portions together, lay them down carefully on the floor at the stern end of the line *A-B* with the straight edge of the board parallel with the line. Trace the curve of the canoe stern on the floor by drawing along the edge of the paper.

The paper and board may be now removed and a line, *E-F*, perpendicular to *A-B*, should be drawn touching the curve. Measure on the canoe itself the distance from point *E* to the location of the forward side of the engine flywheel when the engine is placed at the point selected. This point *G* we will select as 8 inches aft of the thwart. Let us assume that this distance is 4 feet and lay off this distance from *F* on the base line, as at *H*. At *H* draw a vertical line, and on this lay off a distance equal to the thickness of the planking and ribs of the canoe. Be on the safe side with this, as it is always well to have "finger clearance" between the flywheel and the bottom of the canoe. Suppose the ribs are ¼ inch and the planking ¼ inch; call it ⅝ inch to be safe. If your canoe has an inside keel its depth must be added. Having laid ⅝ inch, add to it 1 inch for clearance and then add the radius of the engine flywheel. If your engine has an 11-inch flywheel you have reached the point *J*, 7⅛ inches above the base line. The point *J* will thus represent the center of the forward end of the crankshaft. Connect *F* and *J* with a straight line, using a straight-edged board as a rule, or by means of a carpenter's chalk line, and you now have located your shaft line.

The next thing to determine is whether the center of the shaft line is above, below or even with the plane of the base flanges on the engine. If it is in the same plane the shaft line, *F-J*, will also represent the top of your engine timbers. If it is above or below, measure the distance; and, supposing this plane is ¼ inch below the shaft center, draw a line, *K-L*, parallel with the shaft line and ¼ inch below it. Next draw a line, *M-N*, parallel with the base line and ⅝ inch above it, to represent the inner surface of the ribs, ⅝ inch having been taken as the thickness of ribs and planking. Measure the distance from the forward end of the crankshaft back to the forward end of the base flange. Taking this as 4 inches, lay off the 4 inches from *J*, and the point *O* thus reached will be the forward end of the foundation or engine timbers. Measure back from *O* the length of the base flange and lay it off on *K-L* as *O-P*, which we will call 6 inches. The logs should be longer than this to give a good "water bearing," which is the main thing to give a solid foundation in a canoe. I advise 18-inch timbers for a single-cylinder, 2-horsepower motor, and with a two-cylinder just enough more length to extend under the extra cylinder. You can, of course, trim down the free ends of the logs, which should be cut out from 2½ or 3-inch stuff. Clear white pine makes an excellent material for this work. The exact measurements may be taken from your floor diagram, but it is always well to leave extra height—that is, don't cut down exactly to *O-P*, as it is easy to plane down after they are in position when the engine shaft is being lined up. I would leave them at least ¼ inch higher than the measurement calls for. This gives you an easy way out if you have made a slight mistake in your measurements.

Measure the distance on the floor from *H* to the point *R*, where the shaft line goes through the hull, and by laying off this distance in the canoe itself from the line *G* you can locate the point at which to cut your shaft hole. If you intend to use a wooden shaft log, this hole should not be cut until the engine timbers are in place in the boat. With them in place, a cord can be stretched or the propeller shaft itself can be used to give you the angle, and you can bore through hull and log at the same time. If you use a metal shaft log such as can now be obtained, made especially

for this purpose, you can cut the hole at once, set in the timbers, rest the engine on them and pass the shaft through the hole and into the engagement with the shaft coupling on the engine. Next slide the shaft through the stuffing box on the metal log and move the log along the shaft until it fits on the canoe. If you have an outside keel it must, of course, be cut away to accommodate the shaft log. A gasket of rubber boiler packing may be placed between the log and the hull, so that an absolutely tight joint is secured when it is bolted on, especially as the flanges on the log may be hammered or sprung to a tight fit at all points, even if at first they do not appear to fit exactly. If a wooden log is used it should be cut out of a piece of good clear timber and cut out to exactly fit the curve of the hull.

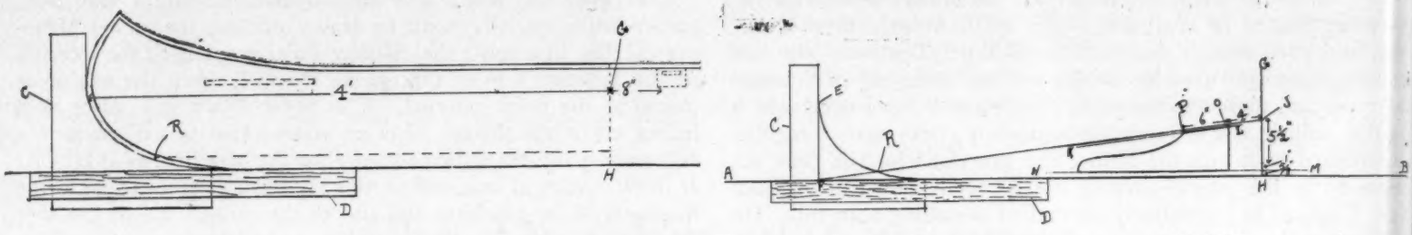


FIG. I.

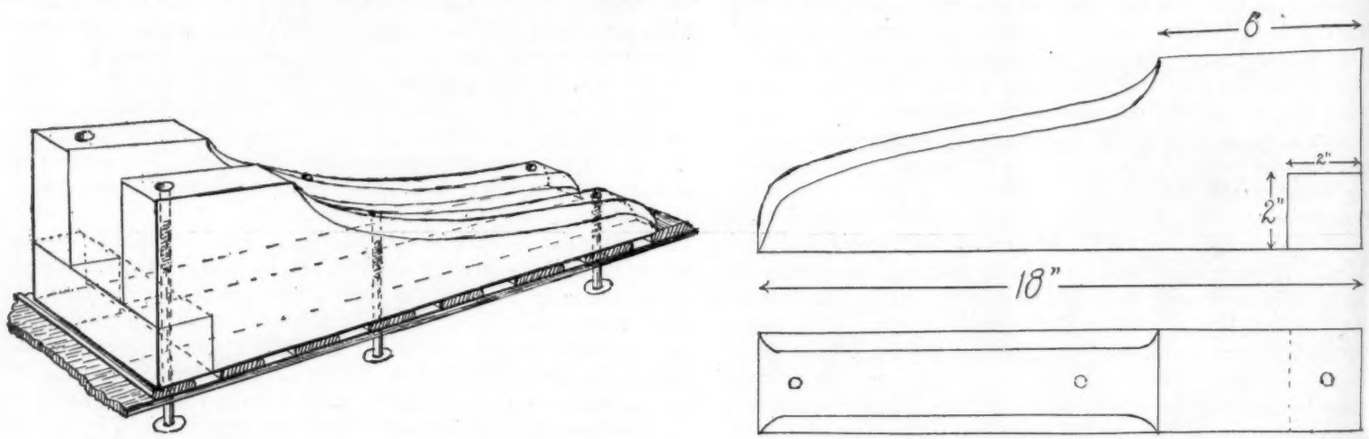
The engine timbers, shown in Fig. 3, may be used with or without the cross-piece. If the latter is used, it should be notched out if there is an inside keel. I have found that bronze flat-headed bolts are the best to use in bolting in the timbers, but ordinarily wrought-iron carriage bolts will give good satisfaction for fresh-water work. One bolt should be used in the middle and one at each end of each log, the flat heads being on the outside of the hull and the nuts on the inner ends being provided with washers. Large brass washers may be used outside under the heads, and a little hemp or wicking, well soaked in white lead, should be wound around under the head of the bolt before it is driven home and drawn up tight. This will avoid all danger of leakage around the bolts. Each bolt should be located so as to pass through a rib if possible.

You are now ready to line up your engine and shaft by planing down and trimming up the tops of the timbers. To facilitate this planing, and also to avoid interfering with the engine base, it is well to countersink the nuts and washers and cut off the ends of the bolts below the top of the timbers. If possible, let at least one of these bolts run through the engine base flange, as this ties the engine, canoe and logs tightly together. In lining up care should be taken with the supporting of the canoe. One support should be under the shaft log and another under the engine, to prevent all sagging. Remember that in the water the hull is supported at every point below the waterline, and you may get a decided sag out of water which will throw you out of line when the hull is afloat, necessitating a relining. The weight of the canoe itself should not cause it to sag, so the supports should be put under before the engine is set in.

The switch should be located within easy reach from where you will sit while operating the craft. The batteries and coil may be placed in a covered box and hung on the gunwale, but the best place for them is under a seat, if you have the usual cross-thwarts fastened in your canoe. The gasolene tank may be placed under or upon either the bow or stern decks, and, in placing it, remember that its bottom should be at least 6 inches above the gasolene level in the carburetor bowl, so as to have a good gravity feed. If necessary, the carburetor may be lowered by using pipe elbows to form an intake pipe from carburetor to engine. The cooling water may be piped through the bottom near the engine, preferably through a rib, and with jam nuts and washers both inside and outside. It is well to use a hose to connect the pipe somewhere between this inlet and the pump, as its flexibility takes up any vibration.

The outlet water may be piped into the exhaust pipe or directly overboard, and the exhaust may be out through the side of the canoe or under water. If the latter, a fair-sized expansion chamber should be used, as a vibration may otherwise be caused by the pulsation of the exhaust as it strikes the water.

There is an exhilaration in motor canoeing which can be obtained in no other craft which costs less than double the price of a good, fast motor canoe. This is due to the smoothness of running and the close proximity to the water. Ten miles an hour seems like thirty in an automobile on land, and no one who has ever tried it has ever voluntarily given it up.



FIGS. 2 AND 3.—DETAILS OF ENGINE BED.

Some Ignition Pointers for the Boatman

By STILLMAN TAYLOR

THE electric system is undoubtedly the most prolific source of engine failure in internal-combustion motors, and trouble of some kind or other is certain to happen sooner or later to every owner of a gas engine, it matters not whether the motor be a little three-horse "one-lunger" or a high-powered, six or eight-cylinder flyer. Although the ideal motor (a power plant that is really immune from trouble) has yet to be made, still ignition troubles, like other failures, are generally due to carelessness and neglect, and the man who is methodical in looking after the many little details of his "ship" is not generally overburdened with ignition, carburetor or other engine difficulties. The electrical plant and ignition layout used for marine engine work is neither a mysterious maze of copper wire nor a "box of tricks," as the novice is quite likely to assume. It is not necessary for the boatman to become a graduate engineer in order to keep the ignition system up to its allotted work; but as knowledge is ever a desirable requisite, every owner of a motor boat should make it a point to become thoroughly familiar with the sparking system installed in his particular craft.

While all ignition troubles may be aptly styled "common failures," in that they are common enough when once located and understood, weak and exhausted batteries are oftentimes the most prevalent cause of ignition failure. A dry battery is really a very dependable source of electrical energy, but it needs some little care and will not, of course, last indefinitely. In the ordinary type of primary battery—commonly known as the "dry cell"—the electrical current is produced by chemical action of the elements within the battery itself, and as this form of battery is quite inexpensive as regards initial cost, it is much better to replace the worn-out and exhausted cells than to devote much time in the fruitless endeavor to doctor up the faulty cells. In another type of primary battery which is quite largely used for marine work the elements and electrolite which are consumed in producing the current require to be renewed occasionally to keep the battery up to the proper voltage or pressure. In this form of battery the simple replacement or renewing of the used elements will restore the battery to its normal condition.

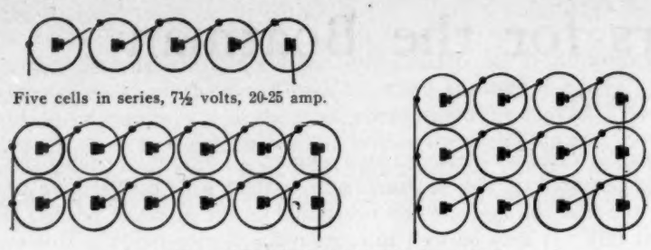
When the primary battery is used as a source of constant current supply, the usual method is to connect up a series of two separate sets of dry cells, each set having from four to six units. As a dry cell is subject to more or less rapid deterioration while in use (and because of this is considered somewhat unreliable), it is advisable to hold one set in reserve and to provide a double-throw switch for cutting out all but the one set used for producing the spark. A single dry cell is generally supposed to give about 20 to 25 amperes and 1¼ volts, but the voltage continues to decrease with the use of the cell. It may be noted that an "ampere" is the unit of volume, while a "volt" is the unit of electrical force or pressure, the "ohm" being the unit of resistance. Accordingly, we connect up a dry battery in series; that is, the carbon or positive of the first cell is wired to the zinc or negative pole of the second cell, and so on until all the desired units are coupled up. This manner of connecting will leave the carbon of the first and the zinc of the last cell in the series free for battery terminals. A four-cell dry battery connected up in this manner will have a voltage of 4 x 1¼ or 5 volts. In the multiple or parallel connection—that is, where all the carbons and all the zincs are connected together—we would get four times the amperage, but the voltage would be the same as a single cell.

To determine the condition of the battery, it should be frequently tested by means of an ammeter. To do this, simply place one terminal of the instrument in contact with the positive post of the first cell and the other terminal on the negative post of the last cell. It may be well to caution the novice that the ammeter should only be held in contact with the battery long enough to secure a reading, as it short circuits the cells, and, therefore, soon runs them down. It is also a good plan to now and then test each cell separately, owing to the fact that one unit may become exhausted before the others in the same set.

While it is good advice to renew the cells when they drop down to six or seven amperes, it may happen that the boatman is caught out of the home port, and in case the dry cells are too far exhausted to make a good spark, the best method of doctoring them up is to revive them temporarily by punching several small holes through the top into the paste and fill up the holes with water or sal-ammoniac, if this may happen to be at hand. This will act as a bracer to the nearly dead cells, and by supplying the needful moisture to the dried-out paste the amperage may be thus brought up to eight or ten amperes. Another useful remedy of last resort, which will often enable the craft to be brought into port, is to connect up the two sets of dry cells in "series," which will increase the voltage, as the current flows through all the units, and a combined pressure of each individual cell is secured. Naturally, these rough-and-ready remedies are nothing more than temporary expedients and cannot be depended upon to furnish any considerable amount of sparking service, as the voltage will very rapidly fall until the cells are quite "dead" and useless.

Where dry cells are not desired, boats (especially those fitted out for cruising) may be equipped with a storage battery or accumulator. A storage cell—otherwise known as a secondary battery—consists of a set of positive and negative plates or grids. The positive plate, containing lead dioxide, is of a dark brown or chocolate color, the negative set being of a gray color and filled with pure compound lead. These plates or grids are immersed in dilute sulphuric acid (oil of vitrol), and are contained in hard rubber, porcelain, glass or celluloid retaining cases. As may be inferred from the term, the storage battery must be charged with electricity before it will give out its electrical energy, and this may be done either by a primary battery or by dynamo. When the electric current is forced through the cell a certain chemical action is produced in the plates and the battery is said to be charged. This stored-up energy may be taken from it as required, and the operation of "charging" and "discharging" may be repeated a large number of times, since the elements are not really lost, but are changed into sulphate of lead, which is again restored to the plates and electrolite during the process of recharging. Unlike the dry cell or primary battery, the storage cell will give the best service when it is in constant use, and for best working results the storage cell should be regularly charged at intervals of four or five weeks' time, and this should be done even though but a small fraction of its energy has been used.

The storage battery or accumulator cell is, however, much more likely to become short circuited than the dry battery, and the "short" is generally due to loose terminals or to plates which have become buckled, allowing the positive and negative elements to come in contact. This latter trouble is mainly caused by improper charging, and to avoid possible injury to the plates the battery should be invariably charged at a slow and even rate. If the storage battery has been neglected either because the time of charging has been put off or because the electrolite has been



Five cells in series, 7½ volts, 20-25 amp.

TWO COMBINATIONS OF TWELVE CELLS.

Two sets of six dry cells each, connected up in multiple series, 9 volts, 40-50 amperes.

Three sets of four dry cells each, connected up in multiple series, giving 6 volts, 60-75 amperes.

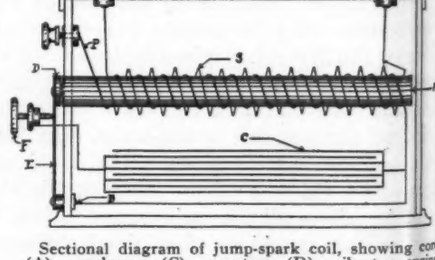
allowed to fall too low in the cases, the battery may become "sulphated." This trouble is caused by chemical action between the lead grids and peroxide paste filler, and may be recognized by the formation of white spots, or a film-like coating, on the face of the plates. In this case the acid electrolite should be poured off into a convenient bottle and the battery thoroughly washed out with soft rain-water, or, if very badly sulphated, the plates will require washing with a wet cloth. After the white coating has been removed, the cells should be filled up with about seven-eighths of the acid, adding sufficient distilled or rain-water to cover the top of the plates. The battery should then be charged at a low-current rate until the plates have regained their normal appearance.

The top of the battery and the terminals should be kept clean. To prevent corrosion and sticking of the binding screws, it is a good plan to put a little oil or vaseline on the threads of the screw before setting them up. That the battery may give out its full quota of current, it is very important to screw up the terminals or binding screws tightly, to afford good electrical contacts. This matter is a mere detail, but the reasons for it should be perfectly plain to every reader, since loose wires and dirty connections are often the cause of the spark being weak and "weedy" at the plugs.

Magneto troubles are not so very formidable after the boatman becomes familiar with the few working parts of his generator, and the few simple directions which accompany the maker's product should be explicit enough to enable the owner to keep this part of the ignition system in good shape. The low-tension magneto is very largely used in marine work, and as this instrument is of the simplest construction and has but few parts, troubles may be said to be almost entirely of a mechanical nature, and short circuits are not nearly as common as in the high-tension system, owing to the fact that the current is of low pressure, and upon this account is not so likely to break through worn or defective connections and insulation. The most common source of trouble is due to "glazing" of the contact surfaces of the brushes or commutator. In most forms of low-tension magnetos the wiping contact is generally made by means of a carbon brush or pencil, one end being held in contact with the insulated ring of the armature by a spring. The contact surface of this brush occasionally becomes glazed, and, as it will then but imperfectly distribute the current, the brush should be removed and cleaned. The insulated ring which connects with one end of the armature winding should also be cleaned of any carbon dust or oil that may have lodged there. A knife may be used for dressing up the contact surface of the brushes, or a piece of fine sandpaper or emery cloth will also be found convenient. Short circuits in this type of generator are usually caused by moisture working into the instrument, or are due to wet wiring, or, as is sometimes the case, to a defective switch. It is, of course, very important to keep the entire electrical system dry, as moisture is one of the most common causes of short circuits or leakage of the electrical current.

In the high-tension system of magneto troubles failures occur in the wiring, plugs, timer and coil, and many of these troubles are almost identical with the battery and coil system. The sparking plug and wiring are, naturally, the most likely places, and in the event of irregular firing it is well to examine these parts first. Test the wiring and plugs, and, if this part of the system is not at fault, the difficulty is no doubt in the magneto itself. The contact breaker of the magneto is the first part to be examined, and as it is important that the contacts of the make-and-break device be kept clean and free from oil, give this matter first attention. In case of excessive sparking, the surfaces of the platinums will probably be found to be quite badly pitted and uneven. If this is found to be the case, the irregular metal should be carefully trimmed up flat and true with a fine flat file. Do not use an ordinary file, but procure a finely cut jeweler's "dead smooth" cut file. In trimming up the contact points some little care should be taken to trim their surfaces flat and even, so that a good contact may be had. If the contacts are very badly worn they should be renewed; if loose, they may be tightened up on the arm by a few gentle and well-directed taps with a light hammer. It is an excellent plan to carry a box of spare magneto parts aboard, such as extra carbon brushes, springs and platinum points. In the matter of adjustment, the spark gap between contacts should be from 1/64 to 1/32 of an inch when the points are separated. The distributor plate should likewise be kept clean and any deposit removed with a little gasolene. The magneto should be kept well lubricated at all times, but excessive lubrication should be avoided; two or three drops of very light oil once a month may be considered ample.

Trouble with the sparking coil is mostly caused by pitted and poor adjustment of the vibrators or tremblers, and if the contact breaker is kept clean and the tension of the spring is adjusted so that the coil will only draw the required amount of current, as recommended by the makers, this detail of the system should not need much attention. Short circuits in the coil may be caused by an accumulation of moisture, oil or dirt between the platinum points, improperly adjusted spring, or due to weak or worn parts of the insulated covering of the wires. Short circuit in the wiring will now and then cause excessive sparking at the tremblers, and, in some instances, may produce internal buzzing inside the coil itself. It but rarely happens that the "short" occurs inside the coil proper, although it not infrequently happens that the insulation becomes broken down because of working inside the insulation of the armature winding. In this case, as well as when the coil has been punctured through careless testing of the spark in the air, the repair is beyond the amateur, and the entire instrument should be sent to the manufacturer for readjustment and repair. Internal short circuits may occur in both types of magnetos, although the trouble is more likely to be found in the high-tension winding. One may avail himself of a very simple test to determine whether the "short" is in the primary or secondary windings. Connect up the volt-meter to the battery terminals, and, after taking the reading, place one end of the instrument in contact with the terminals of the coil. This will readily show a "short" in the primary, as the current must flow through this winding before it gives the reading in the coil.



Sectional diagram of jump-spark coil, showing con (A), condenser (C), armature (D), vibrator spring (E), contact screw (F), primary winding (P), and secondary wiring (S).

A defective condenser will also cause

a short circuit within the coil, and this is either caused by a puncture (breaking down of the insulation) or, as will occasionally happen, the trouble may be due to some derangement of the light wiring, and if the connections are faulty the condenser may become grounded, by reason of the loose or straying wire coming into contact with another wire or conducting body. Condenser troubles are almost always accompanied by excessive sparking at the trembler points. The writer has had some little experience in "doctoring up" sick coils, and has found the chief trouble to lie with the leading wire from condenser to trembler on one side, or in the wire connecting the condenser to the ground. In either case it should be evident that the current cannot reach the condenser (whose function it is to absorb the spark), and it accordingly takes the path of least resistance and passes by way of the leak or short circuit, and so creates excessive sparking at the tremblers. It is seldom advisable to do much tinkering with the condenser or coil, and unless the boatman is familiar with coil construction it is best to send the defective instrument to the maker for repair.

To recapitulate, it may be remarked that the first thing to be examined in case of mis-firing are the tremblers of the coil. This may be done by turning over the engine by means of the starting crank until contact is established at the timer, and if the usual musical buzzing note is heard the current reaches the coil; and the next step is to locate the missing cylinder by placing a bit of paper between the contact studs of all the tremblers but the one to be tested. Each cylinder should be tested separately after this fashion until the "dead" one is located. In most instances the failure is found to be caused by a short circuited spark plug.

The spark plugs are often abused, but it is also true that this indispensable part of the jump-spark system is a very common source of engine trouble. Owing to the fact that the plug is subjected to the extreme heat of the combustion chamber, the usual trouble is due to the breaking down of the porcelain, or, if a mica insulating plug is used, the failure (short circuit) is caused by particles of oil and carbon working in between the layers of mica. In the case of a porcelain plug, the trouble is not always evident at the first glance, as the seat of trouble is often due to a very small fracture of the core. The crack may be quite minute when the plug is cold, but when the porcelain expands under the heat of compression it will open up enough to short circuit the current. In the majority of cases a cracked porcelain may be located by a black, sooty mark on the core, and the latter should be replaced if the core and shell are interchangeable, or a new plug inserted if they are not. Defects in mica insulated plugs are also difficult to locate, and it often happens that there is no visible indication of the defect, the failure being caused by minute particles of soot being blown between the layers of the insulation. A plug may be quite sound, however, and the "short" caused by an accumulation of soot upon the electrode of the plug. A good cleaning with gasolene will, in this instance, prove effective. It is a simple matter to test the plugs, and if a plug gives a fairly hot spark in the air it may be taken for granted that it will fire the charge when it is screwed home in the cylinder.

Other plug failures caused by short circuits are due to the presence of moisture on the terminals, while, again, misfiring may be traced to the compression leaking past the packing gland of the plug. This last-mentioned defect is easily remedied by tightening up the nut until the required adjustment is secured, or a new copper or asbestos washer may be needed to make a good gas-tight joint. When putting in a new plug rub a little graphite on the screw threads of the shell, and the plug will then readily yield to the wrench when its removal is desired. The nut of the packing gland should not be set up too tightly, as too much force will be likely to crack the brittle insulation of the core. A snug fit is all that is required, and the points of the plug should be adjusted about 1/64 inches apart for battery and coil ignition, but some magnetos give better sparking service with a gap of 1/32 inches.

The timer, which is generally of the wipe variety, is now-a-days provided with a roller contact. Although this type of timer is a marked improvement over the older forms, it is important to keep the contact surfaces clean and covered with a thin film of light oil or packed with grease, depending upon which form of lubricant is recommended. The timer should be always kept clean, and, to prevent the lubricant from gumming up, it is a good idea to wash out the old grease with gasolene occasionally and repack with fresh grease or lubricate with fresh oil. Short circuits in the timer are avoided, in most cases, by simply keeping the contact maker clean. In some cases where the timer has been neglected and not kept properly lubricated the constant friction between the wiper and the metal segments will wear off the surface of the latter and the fine particles of metal will become embedded in the fiber or hard rubber ring. These metallic particles are frequently found to be distributed entirely around the circumference of the ring or disc and forming a metallic path for the current, produce short circuits. The older forms of red fiber rings gave considerable trouble, as the material was absorbent, and in damp or foggy weather would frequently swell just enough to depress the segments and so cause the wiper to skip. In the majority of roller contact makers the wiper is kept up to its work by a coiled spring. This spring presses the roller outward and up against the face of the ring carrying the segments. The spring will, after much service, lose its "set" and not exert sufficient tension to insure good contact. The skipping will occasionally set up sparking inside the timer, and the spring should be removed and stretched out or, if too weak, a new spring should be inserted.

As the electric current will invariably follow the path of least resistance, any break or weak spot in the insulation of the wiring will open up a short path for the current, and this leakage is commonly known as a short circuit. A "short" may occur at the timer, coil battery or plugs, and it may be caused by loose or poorly made connections, due to moisture on terminals or wiring, or finally traced to defective insulation. This trouble is more likely to occur in the high-tension or secondary circuit. In some cases the short circuit will make it difficult or even impossible to start the engine, while at other times the trouble is in the nature of a partial short circuit, which will not entirely stop the motor, but will weaken the spark at the plug, cause mis-firing and a falling off in power. This partial leakage is often confusing to the novice, as the symptoms are very similar to carburetor or fuel troubles.

In conclusion, the boatman should take up and check off each part of his system in the event of trouble, looking first to the wiring and connections, then the plugs, and, if necessary to proceed further, tackle the timer, coil and battery. However, if the engine stops suddenly and apparently without cause, do not jump to the conclusion that the whole ignition system is out of order. It is probably caused by an empty fuel tank or an obstructed inlet pipe; but as this phase of trouble is beyond the pale of this paper, we have but time to urge the new hand to go slow about altering every possible adjustment in the hour of trouble, but to rather proceed to hunt down the trouble by systematically checking and examining each detail of the electrical and fuel systems.

By thus methodically attending to the various repairs and adjustments, made necessary by the ordinary wear and tear of service, the boatman quickly becomes familiar with his power plant, and when a breakdown does occur the difficulty is soon located and the necessary repairs made with dispatch. Of course, there are many other ignition troubles; but as most failures are due to common causes, the troubles enumerated are most commonly met with while *en cruise*.

The New York to Halifax Reciprocity Race

ONE of the chief ocean motor boat races of the year will be the New York-Halifax Reciprocity Race of the Brooklyn, or National, Yacht Club, which starts July 22 from Gravesend Bay and finishes at Halifax, N. S.

The course is outside all the way, except that boats are allowed the choice of how they shall go over Nantucket Shoals. The course is an excellent one, being some 550 miles in length, and, while good pilot water navigation will be called for, the way will not be hard to find, a knowledge of nautical astronomy not being necessary, though very helpful, as the longest open-sea run from the last point of departure to Brazil Rock, on the Nova Scotia coast, is but 224 miles. Fog, being prevalent on that coast, is the worst the contestants will have to fear, and the latter part of July the chances are about even of striking clear weather.

If eight or more boats start there will be two classes, the first for boats between 60 to 80 feet over-all length and the second for boats between 40 to 60 feet. If less than eight boats start, all will race in one class. The handicap will be figured according to the rules of the American Power Boat Association.

For the benefit of those who are not familiar with the course, the Nova Scotia coast or Halifax harbor, the following description of the route, with the various courses and distances, and the conditions that may be looked for near the finish, written by a member of the Royal Nova Scotia Yacht Squadron, and a man who knows the coast from Cape Sable to Halifax thoroughly, will be extremely instructive.

COURSES AND DISTANCES, NEW YORK TO HALIFAX

For the benefit of the airmen, I might say that the air line from Gravesend Bay to Halifax is N. 62¼° E. (true), distance 522 miles, and it is remarkable to note that the apparently roundabout route by water is only some 25 miles longer than the direct course. On leaving New York all of the boats will skirt the Long Island shore as far as Montauk, but there will be a diversity of opinion among them as to the merits of heading for Vineyard Sound or going through Muskegat Channel. The latter course would be 2 miles shorter, provided a straight course was steered over the shoals, which show, in some places, as little as three-quarters of a fathom; but if one kept the channel there would only be a saving of about a mile or a mile and a quarter. On this course, which leads close to the southern side of No Man's Land, you would have about 15 miles more outside work than by going through Vineyard Sound, and it is questionable if you would save much time, especially if the wind was anyways fresh from the south'ard. Both courses lead close past Handkerchief Shoals light vessel, so it would be well to plot carefully the two courses up to this point before deciding on their respective merits and leave the choice to conditions found, always bearing in mind the many aids to navigation on the Vineyard Sound side and the comparatively few on the Muskegat side. Unless you are certain that the weather conditions will be favorable, I think the Vineyard Sound course has the call.

Pollock Rip Shoals light vessel is a good point from which to take your departure for Cape Sable, although if you can get through the shoals in a straight line from Handkerchief, leaving Pollock Rip Shoals light vessel about 3 miles on your port beam, you would save a little distance. The course from Pollock Rip Shoals light vessel to the buoy off Brazil Rock is N. 62¼° E. (true), 224 miles, the variation ranging from 13½° to 19°. Some navigators advocate the slap-dash method of taking the mean of the variation, which would make the course E. by N. This method would make you sail a circle to the south'ard of your course. If there is to be any circular sailing at all, the curve should lay on the north side, or on the side of the great circle. Much the better method is to change the course as is necessary. Leave the lightship heading E. by N ¼ N., run 74 miles, alter course to E. by N., run 74 miles, then alter course E. ¾ N., and you will have made a more direct course and the small circle would lay on the correct, or north, side of the course.

The aids to navigation about Cape Sable are very good. Brazil Rock buoy, for which you are steering, is a large circular iron buoy 11 feet in diameter, surmounted by an iron superstructure 30 feet high, exhibiting a white occulting light visible 6 or 7 miles. It is also fitted with a powerful whistle, which is often heard at a distance of 7 miles. About 3½ miles to port of your course, off S. W. Ledge, is another similar buoy, except that it shows an occulting red light. Ten miles to port of your course is Blonde Rock buoy, off Seal Island, similar to Brazil Rock buoy. There are powerful fog horns on both Seal Island and Cape Sable, so if you go astray to port you should be able to pick up something.

But all these are as dross when compared to the seaman's truest friend, the lead. I might say here that it would be an excellent idea to have your boat equipped with a Lord Kelvin patent sounding machine, which would save you much valuable time and labor and give more accurate results in deep water. When you have run 200 miles begin sounding, and do not let her get into less than 20 fathoms—not because of danger, but to keep her on her course. If you get less than 20, haul off E. S. E. until you get the required depth. This will bring you safely up past Cape Sable.

A word with regard to currents. After an interview with two captains, who number their trips across this particular piece of water in the hundreds and thousands, respectively, I have come to the conclusion that, except in rare instances of prolonged gales from one direction, the currents are simply caused by the rise and fall of the tide, running five or six hours in one direction and five or six hours in the other. Neither of these men makes any allowance for current, except when approaching Cape Sable, when with the flood tide they have the current on their starboard bow and with the ebb the current on the port quarter. The nearer you approach the land the stronger the current. It runs about 1½ knots about 20 miles off and about 4 knots as you get into the shoal water near Cape Sable.

On Monday, July 24, from 2 a. m. until 8:30 a. m. and from 2 p. m. until 8:30 p. m. within 20 miles of Cape Sable you will have the tide on your starboard bow, and in a 10-knot boat you should allow at least ½ point to starboard of your course. From 9 a. m. until 2 p. m. the reverse will apply, the current being under your port quarter; but it is not as necessary to allow for this, as the current will help you along and carry you out into the strength of the tide going east. However, do not let her get into more than 25 fathoms, or you may miss Brazil Rock buoy. Keep out from the shore when the tide is flooding against you, as it is quite perceptible inshore for 25 miles east of the Cape, where you lose the tide and won't have to worry about current from there to Halifax.

There are numerous large gas buoys and lighthouses all the way up the coast, so you should have no difficulty in checking the course and distance in running up for Sambro, at the entrance to Halifax harbor.

Having made Brazil Rock buoy, the outer course to the large automatic 5 miles off Sambro Island is E. by N. ½ N. 104 miles, then N. N. E. 10¼ miles to inner automatic, then north 7 miles to yacht squadron anchorage. These two buoys are similar to Brazil Rock automatic. This course would only be necessary under the most unfavorable conditions and by perfect strangers.

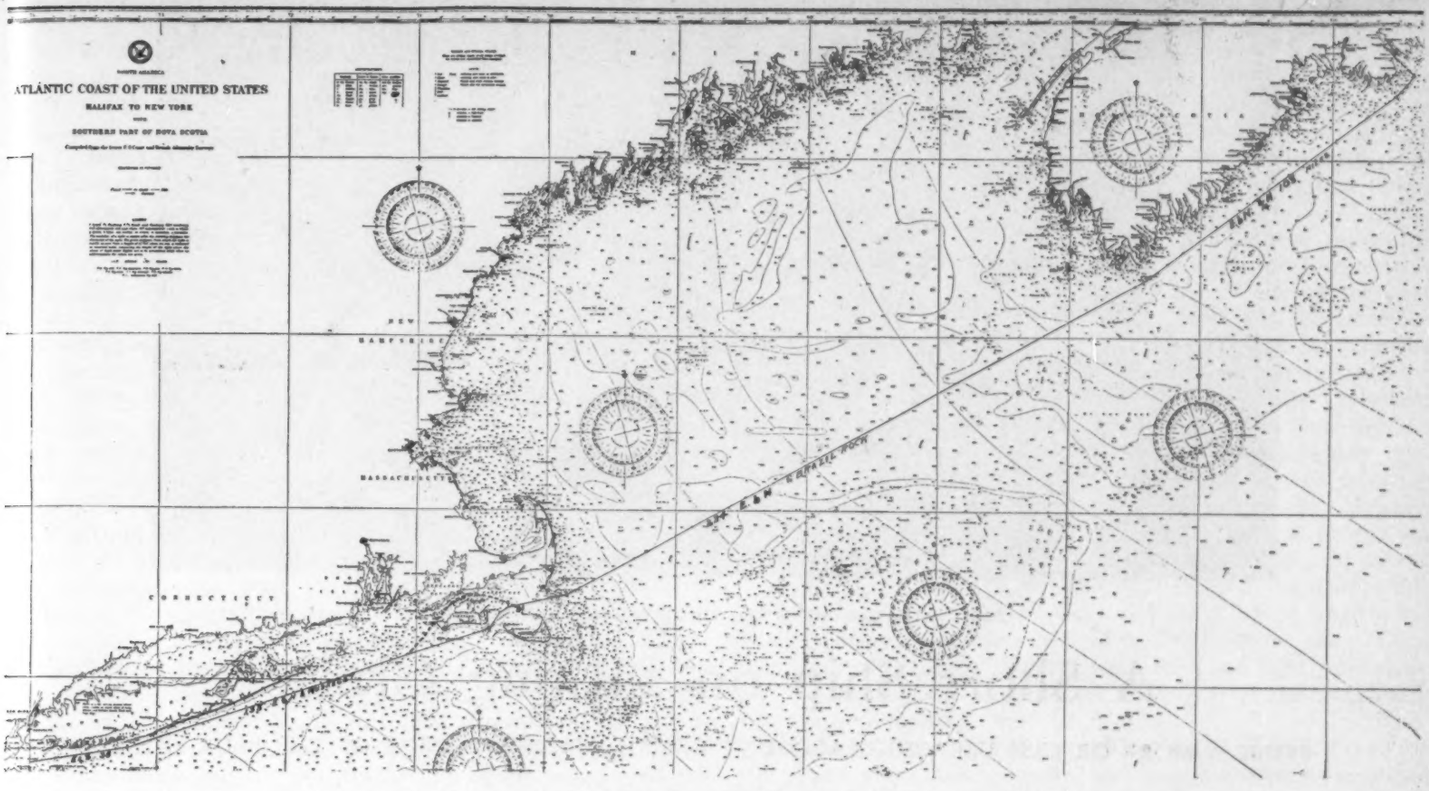


CHART SHOWING COURSES AND DISTANCES FROM NEW YORK TO HALIFAX.

The ordinary course used by steamers is E. by N. ¾ N. 103 miles to black can buoy off S. W. breaker, thence E. by N ½ N. 2⅞ miles to bell buoy off Sisters, thence N. E. by N ¾ N. 3¾ miles to Chebucto Head (on which is operated a powerful fog horn), thence N. ½ E. 8 miles to squadron. The inside course, which we always use, is E. by N. ¾ N. to Pennant automatic (a conical whistling buoy painted black), thence E. by N. ½ N. through the ledges inside Sambro Island (on which is fired a gun at 10-minute intervals), around Chebucto Head to squadron, 17 miles. These ledges are well buoyed (red to starboard and black to port coming in), and, as a straight line leads through, this course should have no terrors for anyone who can see and steer in clear weather. Nine or ten fathoms can be carried through. The harbor inside offers no dangers. Run in N., and you will never touch anything in a small boat until you strike the bank.

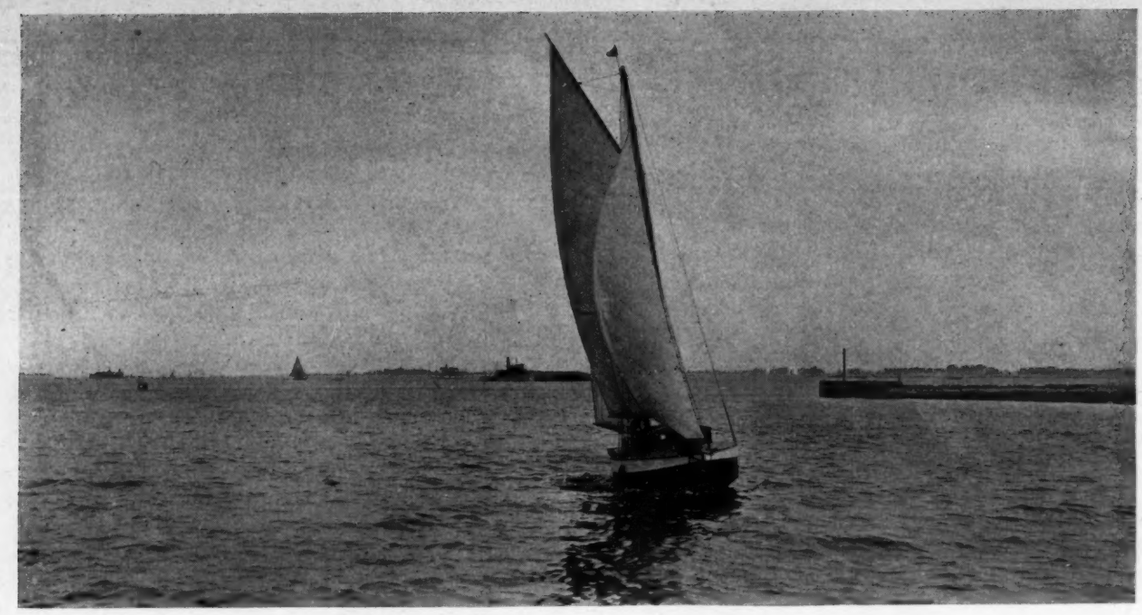
Have on board a good 6-inch or 7-inch liquid compass, properly adjusted all around; but be very particular about the points between E. by S. and E. by N. ½ N., as these will be the ones you will use; a good patent log, well tried-out on known distances; and one of Kelvin's sounding machines, or a good deep-sea lead. The prevailing winds are S. W., so in all probability you will have a fair wind most of the way; so have all the sail that the law allows, as it will help very materially. It is up to some enterprising club to start a race for the windjammers in conjunction with the motor boat race. A summary of the distance is as follows:

	Miles.
Gravesend Bay to Pollock Rip Shoals Lt. Vessel	207
Pollock Rip to Brazil Rock	224
Brazil Rock to Yacht Club (Outside)	121
Brazil Rock to Yacht Club by S. W. Breaker	117¾
Brazil Rock to Yacht Club (Inside)	117
Total distance	552, or 548¾, or 548

With regard to fog, the Government records show that during the month of July, 1910, 363 hours were foggy and 381 hours were clear at Cape Sable; and in August 339 hours were foggy and 405 hours clear, so you will have more than even chances of finding fine weather. But as you come eastward to Halifax the fine weather has it by a large majority. Last summer, of seventeen Saturdays on which races were sailed, only one was foggy. So this is not the land of perpetual "mists and snows" spoken of in ancient mythology, as some would have us believe.

V. C. JOHNSON.

NEW TWIN-SCREW POWER BOAT SPEEJACKS, A. Y. GOWEN OWNER, GAS ENGINE & POWER COMPANY & C. L. SEABURY COMPANY BUILDERS.

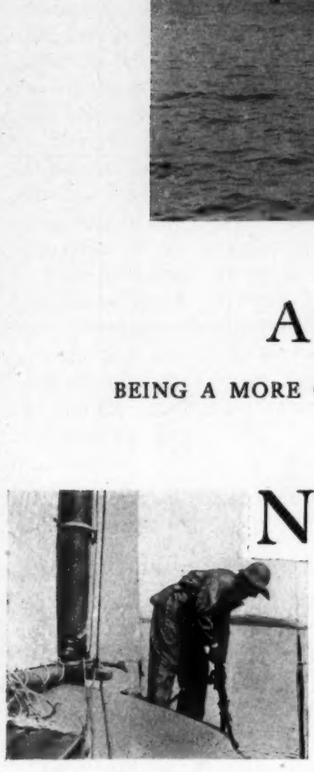


"BLUE PETER CAST OFF AND SAILED ON THROUGH THE HARBOR."

A Short Ship on a Long Cruise

BEING A MORE OR LESS VERACIOUS ACCOUNT OF THE MAIDEN VOYAGE OF THE BLUE PETER

By C. H. J. SNIDER



THE MATE BEFORE BEAUTIFICATION.

NEVER braver navigator embarked than the Midshipmite of the Blue Peter.

It was breezing up from the eastward, and every now and then the rain swept in white sheets over the tumbling waters of Humber Bay. The tender, hauled high up on the beach the night before, had filled with the roaring surf. Out beyond the bursting breakers the brand-new Blue Peter rolled and tumbled at her mooring buoy in the cross seas of the roadstead. The Midshipmite, hastily deposited in the lee of a boathouse, saw the Mate and the Old Man dump the dinghy, work her out to the end of a little pier, half filling her again in the process, and lade her with the outfit for a month's trip.

The Midshipmite was battling a neuralgic headache, it was raining "cats and dogs," the sea was a brain-twister, and the dinghy was loaded to the gunwale; but as soon as the oars were shipped she dashed from her shelter, with a smile as gay as the pink roses in her hat, and, holding an umbrella over her head with one hand and gathering her skirts about her with the other, made ready for the pull for the ship.

"*Do* wait in the boathouse till we come back!" bawled the Old Man, in a voice as rough as he intended his action to be kind, and the obedient Midshipmite—who was also Mrs. O. M.—promptly retired. It was ticklish work getting the dunnage aboard, but they managed it—there was a couple of hundredweight of it in one big box—and then the Mate, armed with extra oilskins from the ship, returned for the lady on the shore.

One thing the Old Man had seen to, above all others—he had a good stove, a gasolener, shipped and in working order. The Midshipmite, somewhat damp and much shaken up by the rough ferrying, gamely tried to start setting things to rights below; but the Old Man had "lit up," and while a kettle began to sing he bundled her into a bunk, covered her up and, making the reluctant patient comfortable with the best of neuralgia cures—a rubber bottle well filled with hot water—he and the Mate made sail, hove up, and got under way.

The Blue Peter had just "come out." She was off on her maiden voyage from Toronto to Kingston, on Lake Ontario, by way of the Bay of Quinte, a proposition, including the return trip, of nearly 400 miles of sailing—not an unambitious project for a craft of 28 feet length on deck.

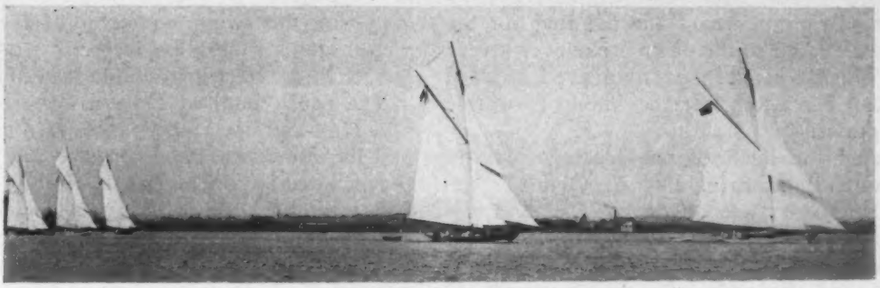
They started her off under mizzen and jib, not knowing how she would carry her sail, but piled the mainsail on after a few minutes' watching.

"She settled to her bearings, but the sails were new and good,
And the ship smelt up to windward just as if she understood."

But in the process there was a crash from below decks and a much-muffled little cry. A survey of the cabin showed a complete tangle of Midshipmite, mattress and spring bed piled in the lee bilge. What had happened was that the port berth, being on the weather side for the time, had left its moorings completely, carrying its occupant with it. The ship was hove-to while the wreck was cleared away, all the berths firmly secured by chocks, and the Midshipmite carefully lashed into position by passing a strong lanyard up and down from the edge of her berth to the deck stringer. This done, the ship was worked into the smooth water in the lee of Toronto Island, through the Western Gap, and across Toronto Bay to the Royal Canadian Yacht Club anchorage. Here, while further stores were being taken aboard, the sun and the Midshipmite, each equally cheery, emerged at the same time and gladdened the scene.

Such of the Royal Canadian fleet as had not already sailed for Kingston were aflame with bunting, and the big steam yacht Florence, ahead of which the Blue Peter anchored, was the

bravest of the brave. Equally resplendent now shone the Midshipmite, who, defying her neuralgia-cummal-de-mer attack, got busy on an exceedingly effective treatment of the crew. By the time everything was aboard from the yacht club the wind had faded out completely, so there was plenty of time to enjoy the result of her labors—a steaming hot dinner, with full trimmings. As the wind had gone and a long, dead roll of a sea was pounding and grinding so hard outside you could hear it over the breakwater, a mile away, it was decided to lie over for the night.



"QUITE A PROCESSION ESCORTED THE BLUE PETER OUT."

Wind and sun bounced up out of the eastward at the same time just as the little ship was nosing her way out of the Eastern Gap of Toronto harbor next day. 'Twas a fine brisk breeze, with prospects of following the sun around through the south, so the Old Man didn't worry much about being gradually headed off on the port tack. Past the long sand bar of Fisherman's Island, the gay pleasure resort at Scarborough Beach, the towering clay bluffs of the Highlands, the piers and pinnacles of the Dutch churches, on to the ridge of the Hog's Back below Port Union the Blue Peter bored her way, till the tiny lighthouse and old red elevator of Frenchman's Bay came out on the weather bow. She had pretty rough going, the sea being a mixture of the preceding day's roll and the morning's chop. All of this was a mean trick to play on the brave Midshipmite, who had downed her neuralgia, but had not yet quite got her sea legs; but things were not so bad after Frenchman's was passed, for the wind, after dying out and leaving a horrible wriggly roll, came in again from the southwest, allowing the boat to swing along steadily with sheets well off. She had been forced pretty well offshore by the headwind, and as the day wore on the Old Man hauled her in to get bearings ere dark. He expected to find Whitby, but the bold, bare face of Raby's Head—which the Midshipmite insisted suggested hydrophobia—soon showed that she had done better than conditions promised, and when within four or five miles of the land Port Oshawa could be made out, just around the corner from the Head. To signalize this little "lift" on the way, the skipper made "lemonade" for himself and all hands, and ere the glasses were put away the winking of the shore lights at Bowmanville had been sighted. The Blue Peter was up with them by dark, having covered 45 miles since leaving Toronto.

The night was clear, quiet and dark, and passed quickly. Two-hour watches were set, the Mate and Old Man alternating at the wheel. The faint gleam of Newcastle Light came and went, Port Hope street lights winked a welcome, the Gull Light, on the lonely island at the end of the shoal between Port Hope and Coburg, beamed forth, and the morning star shot up like the masthead lantern of some advancing steamboat. Soon up came the good red sun. Birds along the shore twittered, and a new day was begun, bringing with it a new breeze — ahead again, out of the northeast. But a few hitches with long legs on the port tack and short ones to starboard brought the Blue Peter abreast of Cobourg harbor. Part of the Royal Canadian Yacht Club fleet, bound to Kingston for the L. Y. R. A. regatta, was lying inside.

BLUE PETER BEFORE LAUNCHING.

The Blue Peter anchored in the outer harbor, within easy rowing distance of the pier. The ship's typewriter came up from the cabin and half-a-dozen letters were rapidly dashed off. By this time the Mate had beautified himself for the shore, so he and the ship's chief adornment manned the jollyboat for a raid on the post office, grocery and marine hardware shops of the town, while the Old Man reefed the mainsail and did a lot of small overhauling jobs which always crop up in a newly-fitted ship. Soon they returned, laden with rope, fresh fruit and light provisions, and once more the Blue Peter got under way as the one o'clock whistles were blowing.

The sloop Meteor, of the Queen City Yacht Club, followed the Blue Peter into Cobourg harbor, and quite a procession of Royal Canadian boats escorted her out—the fine big cutters Aggie, Zelma, and Canada (the original winner of the trophy that bears her name), also the schooner Clorita, the cutter Merrythought and the yawl Naomi. More Trouble, of Buffalo, was also in the fleet. They were all away bigger than Blue Peter, and faster; but while in company with them the Old Man was much reassured as to the stability of his new ship. The wind came off the shore in fluky puffs, now light, now very heavy. The reefed mainsail was first prepared for mastheading, then furled altogether, then piled on her. The rest of the fleet swung everything also, and it was some satisfaction to see that even in the heaviest puffs the new boat carried her canvas as well as any and better than most.

The uncertain character of the northeaster soon had the whole fleet well separated, but the wind died and revived from the southward. This made it a thresh for the fleet, who were all bound for Kingston by the "outside route" on their cruising race around the Prince Edward peninsula, while the Blue Peter had a close haul of it, as she was going down via the "inside route"—that is, by way of Bay of Quinte. By dark they had parted company, and saw no more of each other until moored in Kingston harbor.

About midnight the Blue Peter turned the high lighthouse on Presque Isle Point after a slow jog of nearly eleven hours for the 25 miles. There was not much left of the southerly wind, but it served to take her northwards up the channel, keeping the Brighton range lights in line till abreast of the middle one, when she

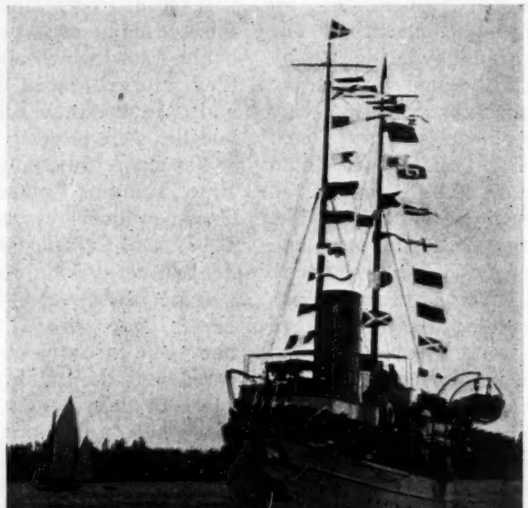
turned east again, passing Brighton wharf and pointing for the mouth of the Murray Canal. And so the dawn broke over a very quiet little ship, slipping silently between rush-bordered, wooded banks, where all the forest choristers were beginning to warble their morning hymns of praise.

The Blue Peter reached the head of the lockless Murray Canal at sun-up. "Beautiful, beautiful Bay of Quinte!" exclaimed the Midshipmite as she came on deck. And she was right.

The canal is just a convenient cutting across the slim isthmus that connects Prince Edward peninsula with the mainland. It has no obstructions other than three road bridges and one railway bridge, and, although it is 6 miles long only, it saves a hundred miles of sailing along an unprotected coast; and, moreover, it gives entrance to one of the most beautiful stretches of water on the Great Lakes. The Bay of Quinte winds for some 70 or 80 miles, now broad, now narrow, now shoal, now deep, between shores low and high, tree-crowned and verdure-clad, with quaint old red barns and stone mills and weatherbeaten wharves cropping out in the most unexpected places. Its reaches and indentations are marked by cities and towns, and it has also many natural harbors snugly hidden in its banks. The wind may blow hard there, but the sea never runs very high, for it has not the space to "make up." There is always a cove or a reach or an island or a port to put into for shelter.

And the scenery? A pair of vast, everchanging friezes of hill and dale and woods and towns and full-bowed sloops and white wooden lighthouses topped by sky of all hues, and water of eternal brown. That is the one fault of the bay. Its water is dyed with vegetable matter. It is almost tepid. You *can* drink it, but you don't, if you've once grown used to the crystal-clear, refreshingly cold water you can dip up over the side in Lake Ontario.

The wind was southerly through the canal, and, of course, the high banks occasionally cut it off altogether; but the Mate and the Old Man took turns on the towpath, with a long line made fast well up the mast, and, with her sails always slightly filled, the Blue Peter followed fast enough to make the passage of the "raging canal" in two hours, including the time lost at the toll office at the second bridge.



"FLORENCE, THE BRAVEST OF THE BRAVE."

After passing the picnic grounds and summer resort at Twelve O'clock Point, at the east end of the canal, the Blue Peter emerged into the wider waters of the bay proper. Ahead of her lay Indian Island, with one lone hut on the summit, and, past it, Baker's Island, solid as a pound-cake, its eastern shores glowing ruddy in the morning sun where iron waste seemed to have been dumped. The spires and chimneys of Trenton and the old red covered bridge that crosses the Trent River showed softly in the morning brightness north of the islands. The main channel lies along the high south shore of the bay, and the Blue Peter followed it. The bay contracts at the Nigger Narrows, where there is an island and a little white wooden lighthouse 5 miles or so east of the canal, and for the next five miles it is just a broad river, with the spidery outline of the Bay of Quinte Bridge in the distant skyline marking the entrance to Belleville harbor. This mile-long bridge connects the Prince Edward peninsula with the mainland, and the swing section is at the south end, backed by a picturesque group of poplar trees guarding gray, weatherbeaten houses on a steep, gray limestone bank.

The pause made at Belleville was another hurry-call, for the Old Man and the Midshipmite were anxious to reach Kingston, and the Mate, alas! had to leave for home on the morrow, and they wanted to take him as far as they could. By four o'clock in the afternoon she was again under way, eastward bound. Grassy Point, Snake Island, Cow Island, Horse Point, Ox Point and Point Ann, with their lofty quarry-trestles and cement-work chimneys, all slipped astern, and still Telegraph Island and its lighthouse looked a long way ahead. The Coast Pilot gave it as 7 miles from Belleville, and, after the Blue Peter had sailed an hour and a half with a fresh breeze over the quarter and the blessed lighthouse was still three miles away, the Old Man said things about the boat and the current in the Bay of Quinte not fit to print. She looked to be going through the water at about 6 knots, but it was two full hours before she made the Narrows. Instructions said the lighthouse was on the north side of the channel, but there was precious little water to the south of it, and a skiff that was anchored inshore hailed to "keep out"; so they hauled her up and went to the north of the lighthouse, which proved to be the proper channel. This obvious blunder on somebody's part caused a measurement to be made on the chart, and the island proved to be 12 miles from Belleville instead of 7; so the Blue Peter was forgiven, the current's alibi accepted, and the ship went on rejoicing, although the wind was dropping.

After passing Forester's Island and bringing the high ore trestles and sawdust chimneys of Deseronto abeam, the course was altered sharply from east to southwest, the bay making a sharp turn here, almost going back in its track for the next 10 miles. They were in the Picton Reach, with smooth water, a breeze now light, now wholesail, and now up and down the mast. As the sunset colors faded, the moon flooded sky and water with silver light, while inky shadows crept from high, tree-clad banks. The reach now broadened to a half mile and narrowed to a few hundred yards alternately, and as the moon climbed higher in the heavens the wind died away to a whisper.

When morning came there was a little wind again from the southwest, and, making the most of this, they sailed down into the cul-de-sac at the bottom of the reach, where the prosperous little town of Picton is located, and there regretfully put the Mate ashore, with about an hour to spare for train-time. A brisk sou'wester chased the Old Man and the Midshipmite and the Blue Peter up from the toe of the reach at Picton, past Glen Island and Glenora, with its mills and its lonely Lake of the Mountain and little church on the mountain top. Along Adolphus Reach she fled, heading eastwards once more on the last leg of her outward-bound voyage. The shores streamed past on either side at a 6-knot clip. Pleasant Point, on the south side, marked the last of the Prince Edward peninsula. For the next two or three miles the bright blue waters of Lake Ontario could be seen rolling in from the southward through the Upper Gap; then the long bulk

(Continued on page 554.)

How to Build a 10-Foot, Flat-Bottom Dinghy with Good Carrying Capacity

By GERALD T. WHITE

A SHORT time ago I was asked by a friend if I could not pick up a cheap "dink" for him around the boat yards. So one day I started out on what I thought was going to be an easy quest; but I soon found out my mistake, for not a "dink" was to be had that came anywhere near the requirements called for. Oh, yes, I saw lots of them, priced from $5 up—some simply boxes, squared at both ends, and with a little caulking cotton in them. I saw several of these, and were told that they belonged to a sort of one-design class of "dinks." They might have belonged to a "slammed-together" class, all right; but there was no design there. There were other flat-bottomed dinghies to be had, but the prices were prohibitive for second-hand "junk," and the carrying capacity of most of them was limited. Realizing that in every boating locality, especially since the advent of the power boat, there is a good demand for a dinghy of moderate price, with stability and good carrying capacity and yet small enough to haul up into the cockpit of a 30-foot boat, I decided to design such a boat that would fill these requirements, and would be of such a simple form of construction that the difficulty or labor of building would not deter any boat owner from tackling the job himself.

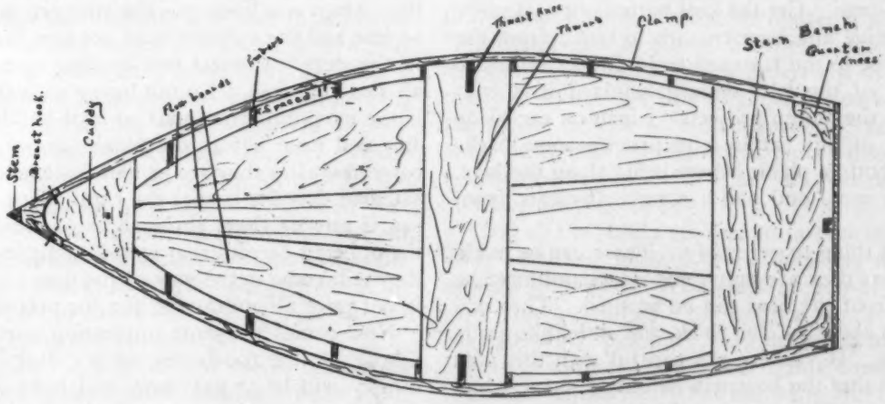
With these points in mind, it was necessary to turn out a boat as simple to build as possible, as I knew that many amateurs start to build a boat, only to find that they cannot finish it, because the one who got up the article did not make the design simple enough in the first place, and did not know how to express himself in the second. In looking over the plans of this boat it will be seen that every part has been designed with a view to making it as easy to build as possible. The type chosen was a flat-bottomed skiff with perfectly straight sides and bottom and straight stern, with V-shaped forward sections to add to her appearance and to make her tow easier. While the boat may not be a beauty to look at, she will have good carrying capacity by reason of the great amount of bearing given by the wide bottom; the V-bottom forward will give her a good entrance, adding to the ease with which she may be propelled; she will have good stability, and be fairly dry for a boat of this size. While she will tow fairly easy, though not, perhaps, as well as one where the bottom aft has an upward curve, her other good points should serve to compensate for this; and at the best one cannot have everything in a 10-foot "dink."

The dimensions of the boat are: Length, 10 feet; beam (outside planking), 4 feet; depth, forward, 2 feet 1 inch; aft, 1 foot 6 inches.

Although the designs have been made as complete as possible, I have not forgotten that many men who will build this boat do not want to spend any more money on it than is necessary. By being as economical as possible with your lumber, so as not to waste any, one should be able to build this little boat for less than $15, probably several dollars less, depending on local prices.

LIST OF MATERIALS AND SCANTLING FOR TEN-FOOT TENDER

Keel, 1½ inches square 9 feet long, oak.
Frames or timbers, 1½ feet by ¾ by ½ inch, oak, 18 pieces.
Planking, ⅜ or ½ inch, cedar or pine; 11 feet by 20 inches, 6 planks.
Stem knee, 1½ inches thick, oak, 2 feet long. Stern post, 1½ feet by 1 inch by 2 inches, oak.
Flooring ½ inch, pine; 20 feet (board measure).
Seats, ¾ inch, oak or mahogany, 10 feet.
Sheer clamp, ¾ by 1 inch by 11 feet, beveled oak, 2 pieces.
Bilge stringer, ¾ by 1¼ inches, white pine or spruce, 11 feet long, 2 pieces.
Breast hook, 1 inch thick, oak, 6 inches by 9 inches.
Quarter knees, 1 inch thick, oak, 6 inches square.
Keel batten, 2½ inches by ⅜ inch by 9 feet, pine.
Stern board, ¾ inch thick, oak. Floor timbers, 4 feet by 3 inches by ¾ inch, pine, 9 pieces.

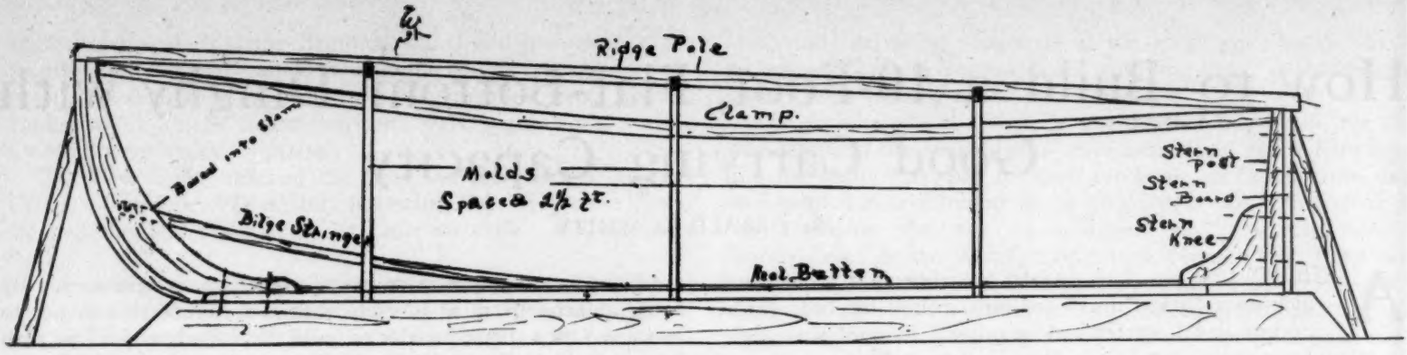


DETAILED DRAWING OF 10-FOOT FLAT-BOTTOMED DINGHY.

The above is a list of the lumber needed. Take this to two dealers and get their prices on it.

Order all the lumber at one place and at one time; you will get it much cheaper this way, for you usually get "soaked" when you buy a plank at a time. After purchasing the lumber the first step is to decide where you are going to build the boat. Do it under cover, if it is possible; if not, get a big piece of canvas that will cover the whole boat when you are not working on it, as dampness will quickly ruin a partly finished boat.

First, get out the keel to the dimensions as given in list of scantling, and at the same time a long piece of rough wood about 1½ inches thick for use as a keel mold, to which to fasten the keel, so that it will be the right shape forward and aft and have the right amount of curve on the under side. The shape of this keel mold is shown in the setting-up plan, the measurements being made from the floor line up to the top of the keel mold or the bottom of the keel. When you have the keel out you can get the stem and stern post out, as shown in the drawings and the table of scantlings. The rabbetting of the stem is rather a difficult matter unless you are used to handling tools, so go slow when you are making it, so that you will not spoil the whole stem piece. If you follow the drawings carefully and keep making measurements to see that you do not cut too deep (¼ inch if you use ½-inch planking), you will find that you can turn out a good job on this part of the work. Cut out the stern board to shape and measurements as in drawings, and plane off both sides of it with a smooth plane, as this will be the last chance of smoothing off this piece.



SET-UP PLAN. THE DOTTED LINES SHOW LOCATION OF FASTENINGS.

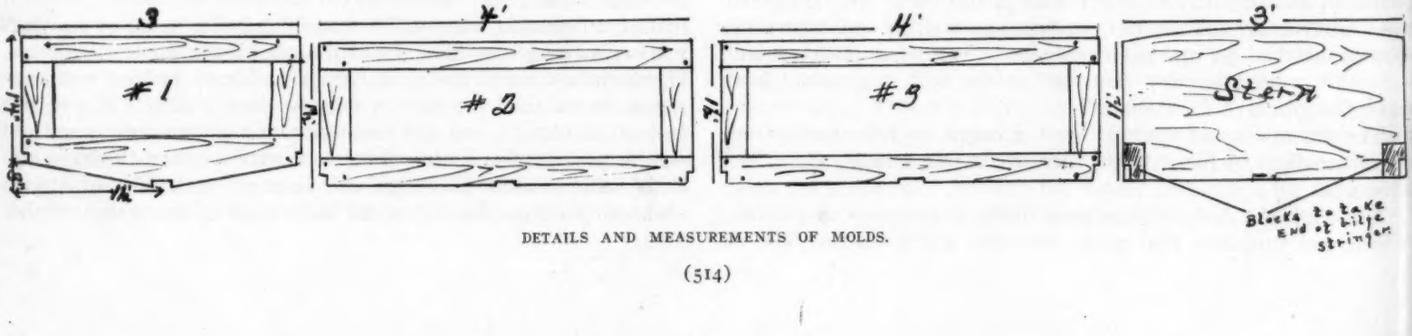
When all of these parts have been gotten out and smoothed, fit them together as shown in the drawings, being sure that wherever there is a joint you have the pieces perfectly square, so that the joint will be tight and strong. On the detail drawing of the stem you will find the location of the stop-waters. These are simply ⅜-inch holes bored straight through the stem from one side to the other and afterwards filled with ⅜-inch soft pine plugs set in white lead. These prevent the water from running up the seam and getting in the boat between the stem and the keel. Don't forget these stop-waters, as they are very important.

Now set up the keel mold, being sure that it is perpendicular, and also that it is perfectly straight lengthwise, so that the keel will be held to the right shape. Get the keel batten out of a piece of soft pine 2½ inches wide and long enough to reach from the after end of the stem knee to the forward end of the stern post. Nail this batten on top of the keel with galvanized iron boat nails 1 inch long, so that the batten projects ½ inch on each side of the keel. The object of this batten is to provide some backing for the garboard, or bottom plank, where it fits along the keel. Now set the keel on the mold and nail a couple of cleats from the mold to the keel.

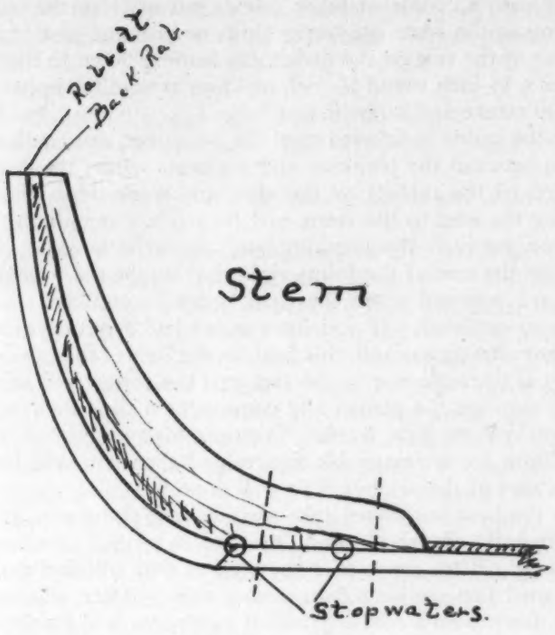
The molds are the next thing to get ready. These can be made from any rough lumber, as they are only temporary, and must be removed before the inside of the boat can be finished. They can be made out of soft wood about ¾ inch thick, and should be made exactly like the drawings. If you are not careful with this part of the work you will find that the boat will be out of shape when you come to the planking. When the molds are all made set them up carefully on the keel, being sure that they are perfectly plumb, that the top cross piece is at right angles to the keel, and that the center line on the cross piece is exactly over the center line on the keel. A plumb bob is invaluable at this stage of the game. Also, be sure that the molds are set at the right distance from each other and from the stem and stern. To hold these molds, you will have to run shores from the sides to the floor and also from the top to the keel. Now run what is called a ridge pole from the top of the stem to the stern and screw it fast, then shore the molds to the ridge pole as shown in the drawing. The ridge pole can be made of soft wood about 2 inches square. This is put on to hold the molds securely while the planks are being put on, and also to provide something to lay the boat on when she is turned bottom side up when you are putting on the bottom plank.

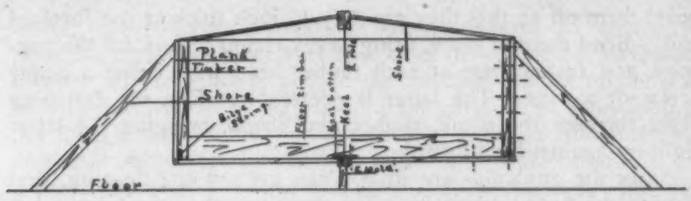
When the boat is securely shored, you can get out the bilge stringer, the measurements of which are in the table of scantlings. Get the stringer out of a piece of clear white pine or spruce and fasten one end of it in the stem, as shown in the drawings, with a good-sized brass screw well countersunk into the wood. Next bend the stringer around the molds, fitting it in the notches that you cut for it, and then fasten it to the stern board with another brass screw. Do this on the other side of the boat, and you are ready to plank the hull—that is, if the molds were made right and are correctly set up. You will undoubtedly find that, after you have run the stringer, some of the molds are out of line and the stringer does not run in a fair line from the stem to the stern. Correct this by shoring the molds so that they are all fair and even. Do not hurry with this part of the work, as it is the most important part of boat-building to see that the boat is fair and even before the planks go on, for the shape cannot be corrected after they are on and fastened. After being thoroughly satisfied that the boat is the right shape, look over the shores and see if any of them show signs of weakness. If so, strengthen them, being careful that you do not run any of the shores so that they will come in the way of the upper strake of planking when it is put on. (See drawing for the proper way to put the shores.)

Now comes the most interesting part of the work of building a boat, be it a 100-footer or a "dink." The planking of this dinghy will be an easy one, as I have simplified the construction so that no one, no matter of what limited experience, can fail to do a good and serviceable job, if he takes his time and uses common sense. The side planking is in one piece, and is preferably of white pine or cedar, ⅜ or ½-inch thick. Smooth this board off on both sides and bend it around the topsides of the little hull, holding it at the stem, molds and stern with clamp screws. Take a pencil and mark out on the inside of the plank where the sheer height on the stem, molds and stern comes, and do the same thing on the bottom of the bilge stringer, marking in the line all the way along here. Also mark approximately the shape that the plank will have to be cut to in order to fit into the rabbett on the stem. Now take the plank off the molds and lay it down on the bench with the marked side up. Get a clear soft-wood batten about 12 feet long, 1 inch wide and ¼-inch thick, and without



DETAILS AND MEASUREMENTS OF MOLDS.





CROSS-SECTION OF SET-UP PLAN, SHOWING SHORES TO HOLD MOLDS IN PLACE. DOTTED LINES SHOW FASTENINGS.

kinks. Lay this on the plank with the upper edge of the batten on the marks that indicate the sheer height, and tack it lightly on the marks. Now sight along the batten and see if it is a fair curve from end to end. If it is not fair, move it up or down a trifle until it is satisfactory, draw a line against the batten and cut the plank out. The lower edge of the plank you have already marked out from the lower edge of the bilge stringer. When sawing out the plank be sure to cut at least ⅛ inch away from the line, as the edges must be planed off afterwards. The best way to get out planks is in pairs—that is, when the plank is marked out from the batten place it on top of another, being sure that the under one overlaps the upper one at all places, and tack them together with brads and get them sawed out and planed up together. This insures their being the same shape.

Now get someone to hold up the after end of one of the planks while you fit the forward end in the rabbett, making a tight joint. Be sure that the plank is held high enough to allow you to bend it around the sheer line without springing it up or down. Fasten it with 1¼-inch No. 8 brass screws, putting a screw every inch or so and countersinking the head about ⅛ inch below the surface, so that it can be puttied over. Put a clamp screw on the stem, so that all the strain of bending around the hull will not come on the fastenings, and bend the plank around, being careful that it just comes up to the sheer line on the molds. Temporarily fasten it to the molds with a long screw, leaving the head of the screw out a bit so that it can be removed without trouble or without marring of the wood. Work aft until you come to the stern and then fasten it there in the same manner as on the stem. Get both planks on and fastened, and you are ready to turn the boat over to put on the bottom planks.

Take the boat off the keel mold, or stock, as it is called, and knock the latter out of the way; then turn the boat upside down and shore it up again, being sure that the boat is on an even keel and firmly shored.

If there is a mill in your vicinity you can call upon it to save a good deal of labor, as you can take the stuff that you are going to use for the bottom planking and have it ripped up to 6-inch widths, finished—that is, let them cut the planks 6½ inches on the saw, and then run them down on the joiner to 6 inches. This insures the edges being parallel and square with the face. If there is no mill near, you will have to get the planks out by hand, using a joiner plane for finishing.

These planks are going to run athwartships from keel to bilge stringer. At the 'midship section of the boat measure the distance from the keel to the outside of the bilge stringer, cut off a piece of the planking a little longer than the distance you measured, fit one end of it into the rabbett formed by the side of the keel and the keel batten, being sure that the plank is laid so that it is at perfect right angles to the line of the keel. Fasten it to the keel batten with either copper nails or brass screws. If you use nails, you must bore a small hole for them, the drill being one size smaller than the nail, so that the nail will just drive snugly. Countersink the heads so they can be puttied, and after all the planks are on rivet up the inside of the fastening over a copper burr. You will find that the screw fastening will be the easiest, as it takes a little experience to be able to rivet properly. After the first plank is on it is a simple matter to put on the rest, working from amidships in either direction. Forward you will find that the planks will have quite a little twist in them, so use great care that you do not split any of them. You will find that the ends of the planks do not fit tight against the keel, so you will have to bevel them, making them tight on the inside of the boat and open a little on the outside, so that you can drive the caulking cotton in when the time comes.

After all the planks are on and fastened you can knock the shores loose and turn the hull over. You are now ready to put in the timbers or frames. The cross-section of set-up plan shows how to do this as well as I can explain it. The timbers are of white oak, about ¾ x ½-inch, laid upon the narrow side. The detail drawings show the method of fitting these timbers to and around the bilge stringer, and they also show the fastenings into the same. Plane off the timbers on all sides before you fit them into the boat. If you have decided on screw fastenings, screw the timbers in place as you fit them in, being very careful that you have all the timbers spaced the same distance apart and that they run at perfect right angles to the keel. Put a screw in about every 2 inches, countersinking the heads.

When all the timbers are in the best part of the work has been done. Get a breast hook out of a piece of 1-inch oak and carefully fit it up in the triangular space just back of the stem, as shown in the drawing. Fasten this well, as it bears a lot of strain, really holding the boat together at this point. Get out two other pieces for the quarter knees out of the same piece and fasten these in the angle that the stern board makes with the upper strake. These should be fastened very well also.

After you have the boat turned over you can take out the molds, as this will make it easier to timber out. Before removing the molds, however, fasten several cross-pieces from sheer to sheer, so that the hull cannot spread. If you do not do this the hull is liable to go all out of shape. Don't remove these cross-pieces until the thwarts are in and fastened. When putting in the cross-pieces remember to put them down about 3 inches from the top of the upper strake, so that you will be able to bend in the clamp or gunwale without removing the stays.

Get the clamps out of a piece of white oak, ¾ x 1 inch, and

bevel them off so that they are only ½ inch thick at the forward end. Bend them in place, using heavy clamp screws for the purpose, and fasten them at each timber head with either a heavy screw or a rivet. The latter is preferable. Run the fastening right through the plank, timber and clamp, bringing the latter tight up against the timber.

After the gunwales are in you can get out the flooring, first getting the floor timbers in. The drawings show how these latter are shaped and fitted, and also how they are fastened to the regular timbers or frames. Get out the floor timbers from either white pine or spruce ¾ inch thick. It will be wise to have the floor line straight, and, to do this, put the after floor timber in first and then the forward one, lay a straight edge from one to the other, and fit all the ones between so that the tops are just even with the under side of the straight edge.

Make the flooring out of either ½-inch white pine or ⅜-inch oak or mahogany, or you can use whatever hardwood you have decided upon for the trim. Oak will prove as satisfactory as anything. Screw in the flooring as shown in the drawings, fastening it well to the floor timbers. If you leave the center strip of flooring loose so that it can be removed, it will prove handy when you want to bail out the boat. If you do leave it this way, put half-a-dozen brass buttons on the strip so that it will stay in place.

The method of putting in the seats is plainly shown in the drawings. The one part that you may not be able to get right without instruction is the proper distance between the after edge of the 'thwart and the center of the rowlock. This should be just 1 foot, as this has been found to be the best location from the standpoint of the oarsman. Fit the 'thwart knees in carefully, as they are very important, really holding the boat together amidships. Make the knees out of oak, ⅝-inch thick (use natural knees, if possible), and fasten them to the 'thwart with either long brass screws or a couple of copper rivets. Fasten the knee to the planking with a couple of brass screws put in from the outside. In putting in the seats use heavy stuff, or else put in a brace in the center of the seat on the under side leading down to the floor. Also, run a ½-inch round ⅝-inch molding around the upper edge of the top strake and screw it fast.

After the inside is finished turn the boat over and caulk along the seam between the planking and the keel. Start the caulking at the top of the rabbett on the stem and work down the stem and along the keel to the stern, and then put a very light bit of the cotton between the planking and the stern board. If you have made the rest of the joints right they ought not to leak, but if they are not well made they had better be caulked. Now a word as to caulking. If you have never had any experience in this do not attempt to caulk this boat, as the lighter the boat is, the harder it is to caulk, due to the fact that the cotton will drive all the way through the planks and come out on the other side, or else it will split the light planks. You can hire a man that will do the caulking for a reasonable figure, and then you will be sure that this part of the work will be well done.

After the boat is caulked take a smoothing plane and go over the entire hull and smooth off all the uneven spots. Don't set the plane to cut off too much of a shaving, or you will find that you have planed the planking dangerously thin. After planing rub the hull down with a coarse grade of sandpaper and finish with a finer grade. If you are going to finish the boat bright on the outside, rub the sandpaper with the grain of the wood, but if you are going to paint it you will not have to be so particular, as the marks of the sandpaper will not show through the paint. I would advise you to paint the bottom of the boat in any case.

Put a ringbolt in the stem for the painter, and another on the outside of the stem for the towing line. This should be about 3 inches above the waterline, and will cause the boat to rise when being towed, instead of digging its nose down in the water, as so many tenders do.

The Tortured Compass

SOME OF THE THINGS THAT AMATEUR SKIPPERS DO TO THE COMPASS AND THEN WONDER WHY THE DEVIATION CHANGES—WHAT NOT TO DO IF THE COMPASS IS TO BE RELIED UPON

By CHARLES H. HALL

THE man at the wheel took a long look through the binoculars at an object on the horizon, laid the glasses in their box, put his head inside the companionway beside him, and called:

"Hey, Bill, didn't you say that East half North would fetch the lightship?" From the comfort of a cabin transom Bill made answer: "Sure, we'll make it a little on the port bow. Ought to be in sight now."

"Well, you're a bum navigator! We'll shave a piece off the land and spoil the chart if we stand on. I don't want to put Uncle Sam to the expense of a new survey just because you can't set a decent course."

By this time Bill is on deck with blood in his eye. "What are you talking about? The course is all right, and will bring us half a mile south of the lightship."

"Sure you didn't apply your deviation the wrong way?"

"Nope. There's only two degrees on East, anyway."

"Tide couldn't set us to the northward?"

"Tide's right on end as we go. What's eating you?"

"Nothing but your masterly inefficiency as a navigator. Take the glass and tell me what that thing yonder is—out here on the starboard bow. Looks like the lightship to my amateur vision."

Bill takes the binoculars and looks in the direction indicated, grunts, looks ahead, climbs up on the cabin house and sweeps the horizon ahead, and finally admits, "Yes, that's the lightship, all right, but what's it doing there? You must have done some weird steering."

"Haven't let her get an eighth of a point off either way. I've been right on the job every minute of my watch."

"Don't understand it! Well, anyway, we don't belong here. Get the lightship open on the port bow. There—that's it. H'm—East Southeast half East. Now that beats the Dutch; never had the compass behave that way before." With this, Bill goes below, gets out the chart, spreads it out, and goes over the course again, grumbling to himself all the while. He rather prided himself on his skill as a navigator, and was accustomed to making long runs and to picking up his landmarks in their proper directions. As he looked over the chart he saw that they would soon cross a range, and that this would give a good chance to check the deviation of his compass. So he took his azimuth instrument, went on deck and prepared to take the bearing of the range as the boat crossed it. The two range marks drew together and he got a good bearing, figured a moment, and swore violently. "What's happened to that compass? She's changed her deviation over a

point since yesterday—since this morning, by Jove! for we made the middle ground as slick as a whistle. What have you done to it?"

"Not one solitary thing."

"What's in that box alongside of the binnacle?"

"Polishing paste and rags. Jack left it there when you called him below."

"Well, let's have it. It'll be sliding overboard if this sea gets up a little more."

Jim passes it over obediently, and, as Bill starts below, yells: "Jumpin' Jehosaphat! look at that compass!" Bill looks, and finds that the boat, instead of heading East Southeast half East, is now a quarter East of South, with the lightship still a little open on the port bow. A light dawns on them suddenly. "What the dickens is in that box? Look at this!" and Bill holds up a nice new marlinspike. "No wonder the compass was crazy, with this chunk of iron about two inches away from it!" and he proceeds to "rouse" out the unhappy Jack and lecture him severely about magnetism, induction, and so on. "And if it hadn't been a clear day, Jack, we might have been ashore before we found out anything was wrong. I couldn't have taken the bearing of that range in a fog, could I? And look at that ledge making out here into deep water. We might have been up on that before we heard the lightship's fog signal."

This experience served to strengthen Bill's habit of taking bearings and azimuths at every favorable opportunity and checking up his deviation table. He knew that the deviation does not alter suddenly and mysteriously; so, a few days later, after preparing for a long run outside and finding that the deviation had changed, he hunted for the cause. Nothing on deck near the binnacle had been shifted, so the cause must be below. The passageway was clean, so were the lockers opening from it; they gave out a fine odor of oilskins and sea-boots, but a search showed no iron or steel. The galley claimed attention next, and the investigation ended here. Cookie, preparing for bad weather, had hung up frying pans, saucepans, boiler, toasting-fork, and other tools of his trade, all within a few inches of the compass, while poker and stove-lid lifter were tucked away on the top shelf. Followed more language and another lecture.

In the fall, when on a hunting trip, a guest suggested a gun rack in the passageway. "Just think how handy it would be. You stand at the wheel and can reach in through the door, grab your gun from the rack, and let fly." Bill grimly bade the guest watch the compass while he brought the guns of the party and stacked them up in the position suggested. The compass swung as each gun was added to the pile, and Bill explained to the guest, who was no navigator, that an error of only a quarter of a point meant one mile in twenty, or five miles in a hundred. "I don't want to pile my boat up on a ledge of rocks just to have my gun handy. Besides, the game warden may get after us. You fellows will be pulling some poor man's lobster pots in clear weather next."

The compass must be used intelligently to be of service, its errors determined and allowed for, and the possibility of its changing with changed conditions recognized. A disturbing mass of iron or steel will do its work just as surely when out of sight as if it were painted bright red and thrust upon one's notice. Dozens of inventors have searched, without success, for some substance that will cut off magnetism. Many have proposed insulating the compass with a soft iron ring around it, not recognizing the fact that if they cut off the effect of deviation-causing iron they would also cut off the earth's magnetism and leave the needle no directive force whatever.

Some queer "stunts" are done, especially in small craft. I have seen an ex-naval officer, who should certainly have known better, tuck his sword under the stern sheets of an open boat, place the binnacle almost over it, and set his course. I have seen another set the binnacle against the hoisting shackle of his boat with its link almost in the plane of the card. I've seen another put the binnacle on the forward deck of a steam launch with a 75-pound anchor forward and 20 fathoms of chain below.

Some years ago I cruised in a sloop with an iron keel. She was fitted with a pretty mahogany binnacle containing a well-made liquid compass. Her cockpit was fairly deep, so that the influence of the keel threw the compass considerably out. (Proper compensation would have cured this, however.) When we wanted to set the course we had to get up the spare compass and put it on top of the cabin house and note the course on the steering compass when on the proper heading by the other one. This spare compass was a cheap dry one, and would "chase its tail" for five minutes every time it was disturbed.

On another boat the sheet anchor, a hundred-pounder, was stowed on the starboard side of the cockpit under the seats. It was used but once or twice a season, but was once tucked away on the port side, as the space on the starboard side was taken up with deck buckets, side ladder, etc. Is it any wonder that the courses after this did not check with those steered early in the season?

A steam yacht parted her tiller rope in the Sound one day, so the captain had the spare tiller shipped and steered her from aft, getting his course from a boat compass placed on deck. The tiller was an iron forging about 7 feet long, and the effect of this mass, with the quadrant below decks, swinging back and forth near the poor compass, may be imagined. It shut in thick, and the yacht almost went ashore on Huckleberry Island, the fog lifting just in time. The proper procedure in such a case would be to set the course by the regular bridge or standard compass, conning her by signals from forward and using a compass aft as an auxiliary only.

Davits near the compass will affect it as they are swung in or out, and those that unship are worse. A big sailor's jackknife in the helmsman's breast pocket will sometimes cause deviation, and small, short magnets near the needle will produce all sorts of funny tricks. The compensating magnets, for correcting semicircular deviation, will produce an entirely new system of deviations if they are placed too near the compass, and so will the quadrantal correctors. Vertical iron, especially if its upper or lower end is about level with the card, will produce deviation. Lecky mentions a case where the stack of a tugboat alongside a steamer affected the latter's compass so that it moved 3°. So don't make changes in stanchions or muffler piping in the stack and expect the compass to remain unaffected.

The motor boat has brought many men to the water who are guiltless of any pretensions to navigating skill, and some remarkable things are done on these boats. Spark coils and switchboards are placed close to the binnacle; the engineer stows wrenches, chisels, pipe tongs, nippers and odd lengths of steel in various corners of his domain. If they happen to be near the binnacle, what does he know or care? But the navigator will care, and should know.

So, distrust the compass, and form the habit of taking *and recording* the bearing of every range you pass, whether natural or artificial. When using a deviation table, do not make the mistake of using the deviation of the bearing, but use that for the direction of the ship's head at the time the bearing is taken. Record also the time and patent log reading. Better still, learn to use nautical almanac and azimuth tables, and make it a part of your routine to take the sun's azimuth twice a day when cruising. If the sun be coy and retires behind cloud banks, you may yet get a chance for an amplitude at sunset.

The Lady Maud, Schooner Yacht

A NARRATIVE OF HER LOSS ON ONE OF THE BAHAMA CAYS, FROM THE ACCOUNT OF A GUEST ON BOARD

By W. CLARK RUSSELL

CHAPTER XIV.

WHEN I recovered I found myself on my back. My senses were active at once, and I had no difficulty in recollecting what had befallen us. I sat upright, and, pressing my hands to my eyes so as to clear my sight, I looked about me.

Some twenty paces away was assembled a small group of persons. These people consisted of Miss Tuke and Mrs. Stretton, both of whom crouched over the body of Carey, and were chafing her hands, supporting her head, and the like; and near them Norie, wringing out his coat. I was amazed to see him alive. A little beyond sat Sir Mordaunt, with his face bowed down to his knees and buried in his hands, and his back turned upon a recumbent figure, the head of which was hidden by a man's jacket. The man whom we had noticed on the beach when the dawn broke, and whom I now recognized as one of the crew named Tom Hunter, was down near the breakers, shading his eyes and intently gazing toward the sea.

I took the scene in at a glance, and was beginning to count the people, to see how many we were in all, when Tripshore stepped round from behind me.

"I thought you wasn't drowned, sir," said he. "You didn't look like a drowned man. There was no good going on chafing of you. How do you feel yourself, sir?"

"I can't tell you yet, Tripshore," I answered. "Is the poor girl I came ashore with alive?"

"I don't know, sir. I've been looking at the ladies rubbing her. I think they'll pull her through."

"And Lady Brookes?" said I.

"Ah, she's dead, sir. She was dead afore Tom and I could haul her through the breakers."

I asked him to give me his hand, and then struggled onto my feet. My limbs were sound, and I suffered from no other inconvenience than a feeling of faintness and giddiness. No one noticed me until I was close to the group, and then Miss Tuke, seeing me, uttered a cry, started to her feet, and grasped my hand. Sir Mordaunt must have heard her, but he did not raise his head nor shift his posture.

"Thank God, you are spared!" cried the girl, speaking wildly, like a delirious person.

"Are these all of us?" I said, motioning with my hand.

"These are all—and my aunt is dead! Oh, Mr. Walton, my aunt is dead!" she exclaimed.

I could make no reply. Mrs. Stretton put out her hand for mine. She could not rise, because Carey's head lay on her lap, but the poor maid was alive, and followed me with her eyes, though she could not move for exhaustion.

I stepped over to Lady Brookes' body and lifted the jacket. It was not necessary to look twice at her face to know that she was dead. Her features were very calm; death was in every line; her eyes were open, and the expression they gave the face was like a command to keep it covered.

As I replaced the jacket softly Sir Mordaunt turned his head. His face was dreadfully hollow, his complexion ashen; he was without coat or hat, and the strong wind, having dried his hair, was blowing it wildly upon his head. His clothes were streaming wet, as, for that matter, were mine and the others'. He gazed at me for a while like a man struggling with his mind. Then said he: "Walton, my wife is dead. I brought her from home to save her life, and my hope and my love have ended in that!" And he pointed to the body. "Why am I spared? I vow I would willingly be dead." Thus he went on complaining and mourning until his voice died away, when he burst into tears, and turned his back upon his wife's body, and resumed his former attitude.

Bitter was this blow to him and to all of us. I looked at the body with a dreadful remorse in my heart. I felt as if I had killed her by that struggle on the yacht's forecastle. But it would not do to sit lamenting our misfortunes and bewailing the dead. We were eight living men and women, castaways, and in me, at least, the instinct of life was a passion that seemed to have taken a violence from my salvation from the sea that lay boiling and roaring in front of me. Where had we been shipwrecked? What shelter would it offer us? Was help to be obtained? These were the questions which swarmed into my head.

There was a small space of rising ground a short walk from where Sir Mordaunt and the others were, and I made my way to it, that I might be alone and able to reflect, and also because it was an eminence that would furnish me with some view of the island. My movements were very languid, and my bones ached sorely; but I was grateful to find that my limbs were sound, which seemed an incredible thing when I reflected upon the terrible violence with which I had been dashed ashore.

I gained the top of the little hill, for I may as well call it so, though it was no more than a small rise in the land about 16 or 20 feet above the level of the island, and stood there leaning against the wind, that was now very nearly a whole gale. I first looked toward the sea. Where the reef was the water was blowing up in clouds of smoke, as though it was really boiling, as it only seemed to be. It was the most terrific picture of commotion I had beheld for many a long year. The great Atlantic seas, reared to a vast height by the fury of the wind, came rolling along with a wild kind of majesty out of the haze of spray which narrowed the horizon to within a league; the crests of them broke into wildernesses of shining froth as they ran; but whenever they smote the reef, that lay in a curve trending on my right to the westward and coiling round into the north with the conformation of the beach, they were shattered into a perfect world of snow, which again was furiously agitated, until near the shore, where the shoaling ground forced the giddy tumblers into some regularity of swing, and they swept in dazzling ivory white volumes upon the beach, filling the air with a most indescribable and soul-subduing roaring noise. A curtain of slate-colored cloud was stretched across the heavens. I shaded my eyes and gazed fixedly at the boiling on the reef, but not a vestige of the yacht was to be seen. It was an awful thing to look upon that raging water and not be able to see the merest relic of the brave, stout, beautiful fabric that had borne us so many hundreds of miles. My heart stopped still when I thought of our preservation, and of my own especially. I had not realized the desperate and breathless and thrilling wonder of it until I stood upon this little hill and looked down at that fearful sea.

I now put my back to the wind to survey the island. How small it was you may guess when I tell you that even from the little vantage-ground I occupied I could view the sea nearly all

around it. I believed at first it was the island of Little Inagua, and in that faith searched in the southwest for signs of the coast of the greater island of that name, but I could see nothing. I then began to think it was too small for Little Inagua, nor was it conceivable that we should have been wrecked so far to the south as that island. As I might judge, the island was not above two miles from east to west, and a little more than a mile from north to south. It was a coral island, what is called a Cay in those parts, almost entirely flat, with a little bay in the southeast, formed by the curvature of a piece of land that resembled in shape the hind-leg of a horse when lifted. Here and there were groups of dwarf trees, nothing tropical in their appearance. About a pistol-shot from the base of the hill was a mass of stunted vegetation that ran to the right and entirely covered the limb of land. Indeed, this island was no more than a desert, inhospitable rock, scarcely more than a reef, without signs of any living creature upon it. Again and again I tried to penetrate the haze which the gale blew up out of the foaming sea, and which hung like a fog all around the horizon, in the hope of perceiving higher land, but in vain. As far as I could cast my eyes the ocean was a storming blank, and, for the solitude of it, this rock might have been in the middle of the great Pacific.

What was to be done? Here we were, cast away upon an island, without a boat, without any visible means of escape, surrounded by reefs, as was easily to be guessed from the appearance of the water, the very sight of which was like a death-warrant, since they were an assurance that no vessels would attempt the navigation of these waters, at least to approach this island near enough to see us. I battled hard with the feeling of consternation that seized me, but I could not subdue it. How were we to support life? How were the women to be sheltered? How were we to make our situation known?

I stood staring around me, with a deep despair in my heart; but this wore off after a little, and I then quitted the hill and walked to the beach, where Tripshore and Hunter stood looking at the sea. The crashing of the breakers and the bellowing of the gale made conversation impossible here, so I motioned to the men to accompany me to the group of trees to one of which the yacht's warp still remained attached, and here we found some shelter.

I sat down, feeling very weak and trembling; and then seeing Mrs. Stretton and Miss Tuke looking our way, I invited them by a gesture to this shelter. Mrs. Stretton helped Carey to rise, and I was heartily rejoiced to see the poor girl capable of walking. Miss Tuke put her arm round her uncle's neck and spoke to him. He looked in our direction, and then at the body of his wife, as though he would not leave it; but on Norie speaking to him, he rose and came to us, helped along by Norie and his niece.

I did not know until afterward that my poor friend had been very nearly drowned when the yacht went to pieces. He was midway along the rope when the vessel broke up, and the warp dropping into the sea, he fell with it, and had to be dragged ashore through the breakers. As I looked at him and noted his hollow face, his hair wildly blowing, his long beard scattering like smoke upon his shirt front, and his knees feebly yielding to his weight as he slowly advanced, leaning forward to the gale, I thought of him as he stood to receive me at the Lady Maud's side in Southampton Water—how full of life and health he was then; how hopefully he looked forward to this summer cruise; how proudly he conducted me over his vessel, and I recalled his tenderness and anxiety for his wife. There *she* lay, cold and senseless as the coral strand upon which the breakers were roaring in thunder. Her time had come, and she was at rest. But her motionless figure, painfully hidden by the rough jacket which Hunter had taken off his back to lay over her, was a most dreadful object for us in our distracted and miserable condition to have full in our sight; and when I looked from it to the halting figure of the husband as he came along, I was moved to a degree I have no words to express.

They led him to where I was seated, and he sank down upon the ground. The others drew near; some of them sat, some stood. I broke the silence by saying:

"There are eight of us living, and we must go to work now and think how we may prolong our lives and ultimately save ourselves. I have been trying to discover other land near us, but the weather is too thick to see any distance. Tripshore—Tom Hunter—have you any notion what part of the Bahamas this is?"

They both answered no.

"Let the island be what it will," I continued, "we cannot be far from inhabited land. We may take hope from that," said I, addressing the women.

"We ought to look for water, sir," exclaimed Tripshore.

"Yes," cried Norie, eagerly; "I am thirsty to death. The salt water I swallowed has left me intolerably parched."

"Try for a natural well first," said I. "If that can't be found, there's a stretch of sand yonder. Dig into it with your hands, or with anything you can find knocking about, and you may come to fresh water."

"I have read that fresh water may be found sometimes by digging in the sand," exclaimed Sir Mordaunt, in a feeble voice.

"Come, sir," said Tripshore to Norie; and the two men marched off.

They had scarcely left us when I caught sight of what looked like a stretch of canvas, resembling an immense mass of sea-weed, coiling over with the bend and fall of the breakers. It washed up the beach, but was swept back again, but I saw it would be stranded presently. It at once occurred to me that if we could secure that canvas we should be able to rig up a very tolerable shelter; whereupon I called Hunter's attention to it, and told him to come with me and endeavor to drag the sail up the beach out of the breakers. He ran down to the beach before me, being much sounder and more active than I; and, watching his chance as the canvas was swept up and the fore part of it stranded, he plunged as high as his knees into the whirl of recoiling foam and grasped the sail. By this time I had reached his side. We hauled together, and, every breaker helping us, we managed to drag the sail out of the water. It proved to be the schooner's main gaff-topsail. It had most of its gear attached to it, particularly a length of halyards. We waited whilst the water drained out of it, and then seizing it afresh, we dragged it toward the trees.

Sir Mordaunt had gone back to the body of his wife, and sat crouched alongside of it, exposed to the strong wind. This made me see the necessity of burying the corpse as soon as possible. But first it was necessary to furnish the women with some kind of shelter. So, having got the sail among the trees, we fell to work, Miss Tuke and Mrs. Stretton lending a hand. Hunter had a clasp-knife in his pocket, and with this we cut away the gear and divided it into lengths to serve as lanyards. These lanyards we hitched to the bolt-rope by making holes in the canvas, and then, selecting a couple of trees for stanchions, we rigged up a kind of tent, the windward side only (as the wind then blew) being protected, for the sail was not big enough to furnish us with four walls as well as a roof.

Rude and imperfect as this contrivance was, however, yet no sooner were the women inside than they felt the comfort of it. Had we been in dry clothes, the wind might have seemed warm enough, but our garments being soaked to the skin gave the gale an edge of chilliness that kept the flesh shuddering. Hence this shelter from the wind was a very great comfort indeed. When our work was completed I went to Sir Mordaunt, and by exerting some force obliged him to come with me. I led him into a corner

Photographs by W. B. Jackson.

OFF BEFORE IT.

OFF MARBLEHEAD.

of the tent, and made him sit upon the grass, that was coarse and thick, but stunted like the trees, as if the blowing of spray from the beach had checked its growth without killing it. I then whispered to Miss Tuke that we were going to remove the body of Lady Brookes, and begged her to help her uncle, under any pretense she could invent, so that he might not see what we were about.

"Are you going to bury her?" she exclaimed, with a look of mingled fright and grief.

"No, not before I consult Norie," I replied. "But we *must* remove the body out of the husband's sight."

So saying, I quitted the tent, and, motioning to Hunter, I told him to help me carry the body around the bend of the little hill, where it would be hidden, and where it might lie until we could manage to bury it. Approaching the body, we raised it reverently. The wet clothes made it a great weight, and, besides, she had been a fine, well-made woman, as I have told you. We went round the base of the hill, and put the body down upon some grass at the margin of a stretch of deep and impervious bush, resembling the growths in Australia in respect of density. We laid the body down here, I say, and Hunter went back for the jacket, with which we covered the face, placing two stones upon the arms to prevent the jacket from blowing away; and this done, I ascended the bit of a hill to look for Norie and Tripshore.

I saw them, when I had mounted a few feet, about a quarter of a mile distant, walking fast, and skirting the shrubbery, that extended, with a very clean, well-defined edge, athwart the island, as though human hands had planted it.

I shouted to them, and Tripshore waved his hand, and when they were within hearing distance the man hallooed out, "We have found water, sir!"

This was a joyful piece of news. It filled me with as deep a transport as ever the intelligence that help was coming could have done.

Whilst we stood waiting for the others I asked Hunter, having had no opportunity to do so before, how he had managed to save his life, and what had become of the other men. His story was very short and simple. When the yacht struck, all of the crew who were below rushed on deck. Pitch-dark as it was, a number of men groped their way to what I have already called the long-boat. They managed to get her over, but how he could not explain, beyond implying that they worked like fiends in their terror, and launched her, he believed, by sheer force of muscle. Nobody thought of anything but saving his life. The belief was that the yacht would clear the reef and founder in the deep water beyond. They believed it was a reef, because they could not see the least signs of land. Hunter knew that some men were drowning in the water to leeward of the deck by the cries which came out of the darkness that way, but it was impossible to help them. When the boat was over, they could see her plainly enough upon the foam, and the men jumped for her, some missing her and vanishing alongside. Hunter jumped and reached her, but he could not tell me how many souls were in her: she was about half full, he thought. But scarcely had they shoved clear of the vessel when a sea took and capsized the boat, and then what followed was just a dream to him. He, being a good swimmer, struck out, not knowing where he was going, for he could see nothing but the white water; but after battling he knew not how long, he was caught by the breakers and flung ashore, where he lay motionless and almost lifeless for a spell. When the dawn came he found himself alone, and the yacht on her beam ends on the reef, with the sea bursting in clouds over her after deck. He saw me standing in the companion, and then Tripshore, but he did not believe there were any more people alive until he saw the rest of our party crowd into the bows. It was he, he said, who caught me by my hair when the breakers had flung me along; but he could not keep hold, and the water swept me back again. The next time he caught me by the arm and held me until the breaker had spent itself, and then dragged me high and dry. Carey, he added, owed her life to Tripshore, who watched for her as he (Hunter) had watched for me, and managed to get her ashore the first time the sea threw her up. Hunter saved Norie in the same way. "And it was wonderful," said he, "how quiet the doctor" (for so Norie was called by the men) "took his bath. I lugged him out, and he was as fresh as a man swimming for to please himself. But Lady Brookes' gell was all but gone, sir. She was black in the face, and not a stir in her when Mr. Tripshore brought her out o' the wash yonder."

Norie and Tripshore now joined us. I at once inquired about the water.

"It's t'other side of the island, past them mangrove bushes," answered Tripshore, coming close to me and pointing. "It's a made well, not a nat'ral one, and it's in the sand. A couple o' casks, perhaps three, have been sunk, one atop of the other, and the one atop has been left standing as high as this," says he, holding his hand about two feet above the ground, "to prevent the sand from filling it up."

"Does it look a recent job?" I asked, anxiously.

"There's no telling, sir," he replied. "I take it to be the work of one of the wrecking vessels which used to knock about among these islands."*

"If that be so, then there may still be vessels which touch here," I exclaimed, with a swell of hope and elation in my heart. "Is the water good?"

"It's rain-water," answered Norie, "but good enough. It has quenched my thirst, which was just maddening."

"How did you get at it?" I asked.

"I dipped with my shoe," he answered, for he had on a pair of low shoes. Then grasping my arm, he pointed to the grass alongside the bushes and exclaimed: "What is that? Is that Lady Brookes' body?"

I told him it was, and explained my reason for bringing it to that place. He went to it, lifted up the jacket, and took a long look at the face, and then, coming back, he said: "It will be best to bury her at once, Walton. It shocks me to think of her lying so."

"I was only waiting for you to see her," said I. "But how can we bury her?" and, turning to Hunter, I said, "Could you scoop up a grave for that body in the sand with your hands?"

He answered yes; it would be no trouble, he thought.

Upon this I asked Norie to help him carry the body round to the east side of the hill, where there was a stretch of sand, and where they could inter it without being seen by Sir Mordaunt and the women. Norie answered that he would take care the body was properly buried, and, after waiting until they had carried it to the spot I had indicated, I called to Tripshore, whom I required to pilot us to the well, and returned to the little tent.

As I walked, I glanced along the beach, and noticed that several portions of wreckage were already thrown up; and numerous black fragments were to be seen amid the white swirl, vanishing and reappearing amid the roaring folds of the breakers and the further surges. But my thirst was too troublesome to suffer me to examine and secure the articles which the sea had washed ashore.

I entered the little tent briskly, and said, in as cheerful a voice as I could command, that a well of fresh water had been found, and I asked them to walk with me across the island to drink.

* I have since ascertained that it was the practice of the small wrecking vessels which resorted to these islands to sink casks in the sand in order to obtain water. These casks were to be found in North Cat Cay, Sandy Cay, and many other islets in the neighborhood of the Great Bahama Bank.

Miss Tuke and Mrs. Stretton, who were seated near Sir Mordaunt, instantly got up, and Carey made an effort to rise. I told Tripshore to support her, and then extended my hand to the baronet, who reared himself with great difficulty and labor.

"Thank Heaven that water has been found!" said he, in a voice so unlike his familiar tone that, had I not seen his lips move, I should not have believed it his. "God has not wholly forsaken us."

"We may think it advisable by and by," said I, "to shift our quarters to the other sde of the island. But first let us see what those breakers will give us of the wreck."

Mrs. Stretton and Miss Tuke walked first, followed by Carey, supported by Tripshore. The mastiff followed in our wake. It was hard for Carey to have to walk to the well, but we had no vessel in which to bring water to her. When Sir Mordaunt, leaning on my arm, stepped forth from the trees, he looked and looked, and then stopped, and, gripping me tightly, said, in a kind of gasp: "Where is Agnes? Where is the body? What have you done with it, Walton?"

"My dear friend," I answered, wrung to the very soul by the misery in his voice, "in the name of God, believe that what we do we do for your sake."

To take his mind away from his grief, and to give him some hope, I spoke about the well that Norie and Tripshore had discovered; how its existence proved that the island had been visited; and how, therefore, we need not despair of suffering and a long captivity in this desolate spot of land. He did not, however, seem to heed me, but walked with his eyes fixed on the ground, and very often he weighed so heavily on my arm that I had some ado to bear up under him.

It still blew a heavy gale of wind, and the sea was shrouded with the haze of the flying spray. Away to the west of the island the sea was running in enormous surges, and the roaring of the surf upon the beach on that side of the island was like a continuous roll of thunder, and the wind was full of a fine salt rain. The sky was one great cloud. I cannot express how desolate this shadow made the whole scene of snow-white storming ocean, and this little flat island, with its chilling and stunted herbage and its groups of dwarf trees here and there, leaning all of them somewhat to the southeast, as though inclined by some strong prevailing wind. One gleam of sunshine, one flash of the glorious tropical luminary, would have cheered our hearts; but it was our fate that the terrible disaster that had overtaken us should be attended with many circumstances of horror.

The spot where the well was sunk was within a mile of the tent. The land, as I have said, was nearly entirely flat, and the greater portion of it, beyond the coral strand, covered with grass, which was rank and long only among the bushes and under the trees. Walking was very easy. Here and there the ground was encumbered with knobs or projections of porous rock, as though the soil that covered the island was not everywhere deep enough to conceal its structure. As we advanced a frigate pelican soared into the air, and struggled a minute or so with the gale, then dropped and disappeared behind the bushes on the right. This was the only living thing I had yet seen on the island.

Tripshore led us straight to the well, which I found sunk in the sand about a hundred paces above high-water mark. It was constructed just as he had described. First, the sand had been dug out until fresh water was reached; then a cask with the ends knocked out had been sunk in the hole, and another cask placed on this, so as to raise a kind of coamings above the sand, to prevent the well from filling.

I bent my head over and saw the water within reach of my arm, looking black, and my face reflected in it.

Our situation came home to me with dreadful force whilst I stood watching the others drink. Even had we all been men, the contrast of our lot now, greedily swallowing rain-water from a boot, standing, with white faces and wet clothes, some of us half dressed and with uncovered heads, round that sunk cask—miserable shipwrecked people, imprisoned by a raging sea, with no prospect of relief before us that the most hopeful mind could imagine—I say, even had we all been men, the contrast of our lot now with what it was aboard the Lady Maud, that luxurious floating home, with its hundred elegancies and comforts, would have made a bitter thought. But that contrast was tenfold heightened by the presence of the women, and especially by that of Miss Tuke. If I was not in love with her, I will not say I was far off from loving her; and so soft was my heart for her that I could not look at her sweet face without a degree of tenderness and grief that almost shames me to recall when I remember how much sympathy I had for her in comparison with what I had for the others, whose distress and sufferings were surely as great. Both she and Mrs. Stretton were fully dressed, having had time to clothe themselves whilst waiting for daylight in the Lady Maud's cabin. Carey was the worst off, having lost her hat and shawl in the water, and her dress being torn by the sea, as a squall splits a sail.

On our return we met Hunter going to the well for a drink. He asked me the road, and I pointed to the well.

"Where is Norie?" Sir Mordaunt asked me; and I thought he seemed to notice for the first time that Norie and Hunter had not accompanied us to the well. I made some answer, I forget what. He looked at me eagerly, but asked no more questions.

On our arrival at the tent we found Norie sitting and leaning his head on his arm. He looked as if all the hope had been crushed out of him. He was like a prisoner in a cell, haggard and shocked, and full of amazement and fear. He glanced from one to the other of us as we entered, and cried: "Don't let any one of you be alone if you can help it! You cannot guess what solitude is here. I have had about five minutes of it, and feel as if another five minutes would drive me out of my mind."

"Don't afflict us with reflections of that kind, Norie," I exclaimed, warmly. "Give Sir Mordaunt your place there, and come you along to the beach with Tripshore and me, and lend us a hand to collect the things which have been washed ashore."

He jumped up, but as he did so Sir Mordaunt gave a little cry. I looked at him, and saw that his eyes were fixed upon the jacket that had covered the face of his wife. Norie had brought it away, and had been lying on it.

"Where is her body?" asked the baronet, addressing Norie.

It was idle to keep the matter from him; so, meeting the doctor's glance, I dropped my head.

"We have buried her," said Norie.

"It was my wish," said I, seizing Sir Mordaunt's hand.

"For Heaven's sake, Norie," said I, as we went along, "don't indulge in any dismal reflections before the women. Keep up their hearts if you can. Bad as our lot is, it might be worse. This island is *terra firma*, anyway. We have found water, and now we must look for something to eat. It is much too soon to cave in, man. You ought to know that."

"Ay," he exclaimed. "But to be alone for even five minutes after burying that poor woman. . . . . I thought my hospital work had cured me of all weakness; but the sweat poured from me when I put the body in the sand, dressed as it was, Walton."

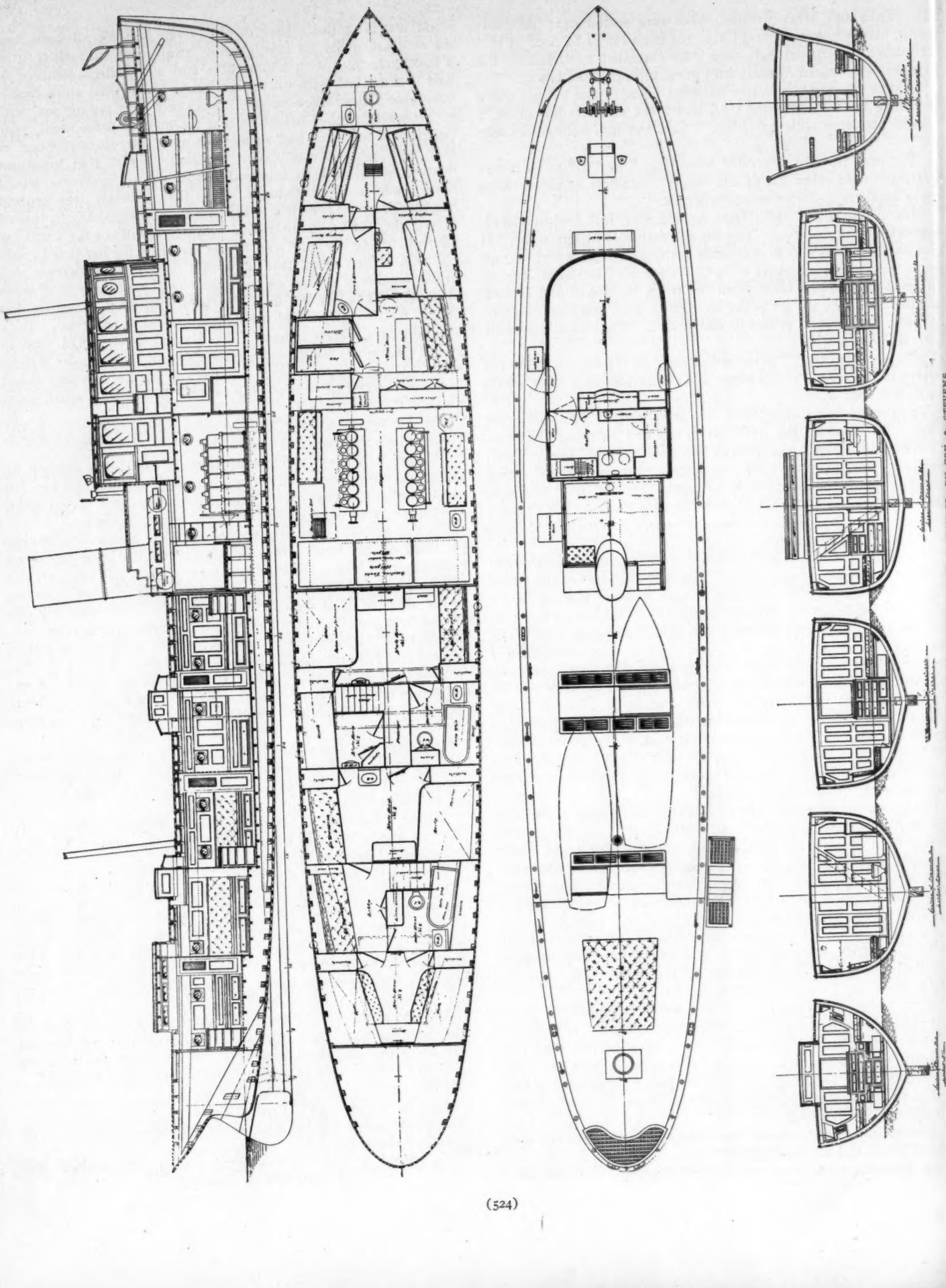
By this time we were close to Tripshore.

"What have you there?" I called to him.

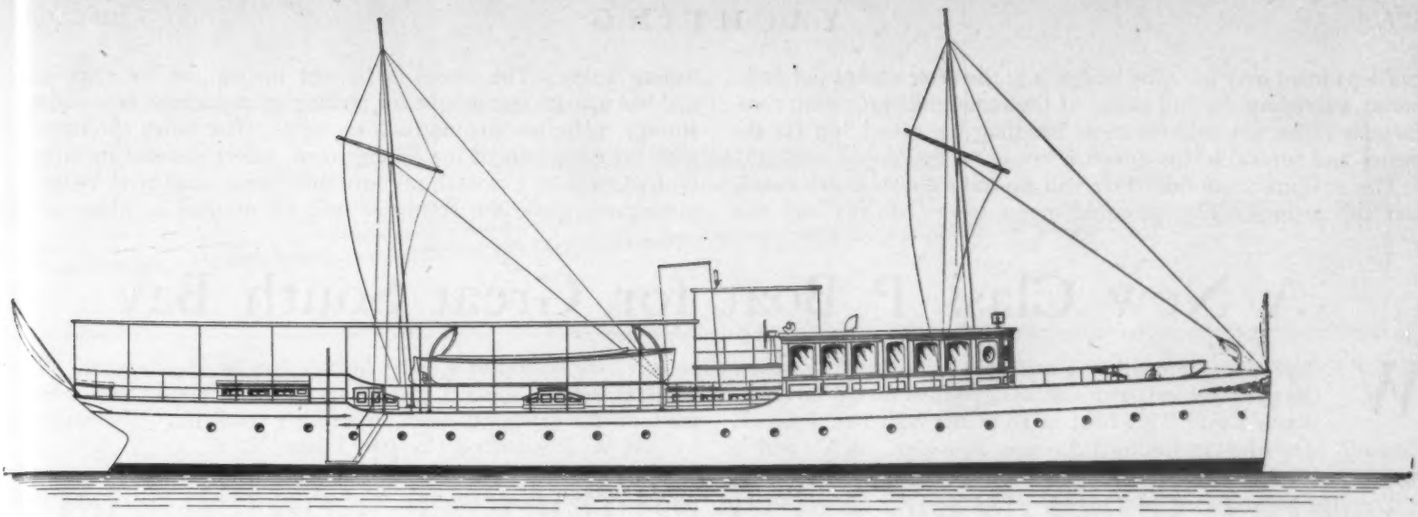
He shouted back, for the roar of the surf was deafening, "The carpenter's chest, sir."

This indeed it was. It was fitted with a shelf midway the

(Continued on page 546.)



PLANS OF 98-FOOT TWIN-SCREW POWER CRUISER BY COX & STEVENS.



A 98-Foot Twin-Screw Power Cruiser

MESSRS. COX & STEVENS have just placed an order for a large cruising motor boat from their designs for Mr. J. L. Inglis, of Jacksonville, Fla., the plans of which we reproduce herewith. This vessel will be named Tuna, and will be ready for delivery in the autumn. Her principal dimensions are: Length over all, 98 feet; beam, 16 feet; draft, 3 feet 9 inches.

This vessel is of the small steamer type, with straight stem and elliptical stern, the beam being carried well aft, affording unusual deck space at this point, while there is a very full forward deck line, the sections being given a great deal of flare near the bow. It is interesting to note that this type of vessel is becoming more and more popular, providing, as it does, the greatest possible amount of accommodation on given dimensions, the most seaworthy hull that can be constructed, and, when properly carried out, producing a boat that is most pleasing to the eye in its symmetry and business-like effect.

The dimensions of this craft were fixed with the view to permitting her to pass through the Erie and Champlain Canals, so that she may be used on both the Great Lakes and Atlantic Coast. Her draft is slightly less than 4 feet, so that she can enter all the Southern harbors, and, at the same time, her dimensions are such that the designers have been able to produce a hull which will be thoroughly seaworthy under all conditions.

The construction is of the most substantial and expensive character, keel and frames being of oak, the planking of yellow pine, the deck of selected white pine, and rail, skylights, companionways and outside of deckhouse of teak, all fastenings being copper or composition.

The motive power—two 100-horsepower, 6-cylinder motors—is placed in a central watertight compartment, separated from the rest of the vessel by steel bulkheads. This compartment is placed over the center of buoyancy, and contains, in addition to the machinery, the gasolene tanks, of 1,500 gallons capacity, and an independent gasolene engine operating a dynamo of sufficient power to light the entire vessel and run the searchlights. Here also are the quarters for the two engineers, with toilet facilities, cots, wardrobes, and other conveniences.

The quarters for the owner and guests are below in the after part of the vessel, and the arrangement has been worked out so that there is practically no lost space in passageways. This is obtained by the use of two companionways, both of them running athwartships. The after companionway lands in a lobby, which may be utilized as a single stateroom. At the foot of the stairs a door opens forward into a large double stateroom extending the full width of the ship, having a double built-in berth on one side with drawers underneath, a sofa on the other side, which may be used as a berth when desired, large hanging wardrobes, bureau and a wash basin. On the starboard side of the lobby is a bathroom of ample size, having a tiled floor and a 5-foot enameled tub. This room has a door opening into the lobby and a door on the after side opening into another double stateroom, also extending the full width of the vessel.

The second companionway starts on the port side of the vessel and lands in a passage from which a door opens forward into the owner's stateroom, which is exceptionally large and extends the full width of the vessel. This room has on the port side a double built-in berth, and on the starboard side a transom that may be arranged for berth, two large wardrobes, a desk and a bureau with plate-glass mirror. Opposite the stairs and communicating with the passage and with the stateroom just described is a large bathroom, having tiled floor, a 5-foot enameled tub, linen locker, etc. Opposite, on the port side, is a single stateroom, with built-in berth, bureau and wardrobe.

The space directly forward of the engine compartment contains fresh-water tanks of ample capacity, a mess room with transom for the crew, and a berth for one man, and a large storeroom and ice box, which may be filled from the deck. Forward of this mess room is a stateroom for the captain and a room for the cook and steward, and forward of this room, again, is the forecastle, having comfortable accommodations for four men and a separate toilet.

The dining-room is in the teak deckhouse, already referred to, and is of sufficient size to accommodate twelve people with comfort, being finished in handsomely paneled mahogany, and having, in addition to the extension table, a sideboard of Colonial design and a writing desk. The after part of the deckhouse is used for the galley and pantry, having a coal stove, sink and usual dressers and dish racks, there being a dumbwaiter from this compartment to the mess room below, so that the crew's food is readily sent down to them.

The vessel is flush decked, there being no obstructions whatever, except the companionways and skylights. Over the after stateroom there is a small flat hatch, giving splendid ventilation to the rooms below, and being also used as a deck seat or lounge. At the stern is a teak grating, arranged as a seat and having

cushions fitted over it. The bridge is at the after end of the deck-house, extending the full width of the same, thus providing comfortable room, not only for those handling the vessel, but for the owner and several of his guests.

The equipment of this craft will be complete in every detail, and will include a high-powered motor tender, dinghy and two fishing boats. The vessel is lighted throughout by electricity, and has a large searchlight for picking up moorings, etc., and has storage batteries of unusual capacity. The finish throughout, with the exception of the dining-room, where paneled mahogany is used, will be Colonial, all furniture, doors and trim being of mahogany, while the bulkheads will be finished in white paint.

A New Class P Boat for Great South Bay

WE reproduce herewith the sail and deck plans of a new class "P" centerboard boat designed for racing on Great South Bay. This boat is from the board of John A. Connolly, Jr., of 2573 Bedford Avenue, Brooklyn, N. Y., and is now being built at Center Moriches, L. I., for Mr. Warren Leslie.

The dimensions of the boat are:

42 feet long over all;

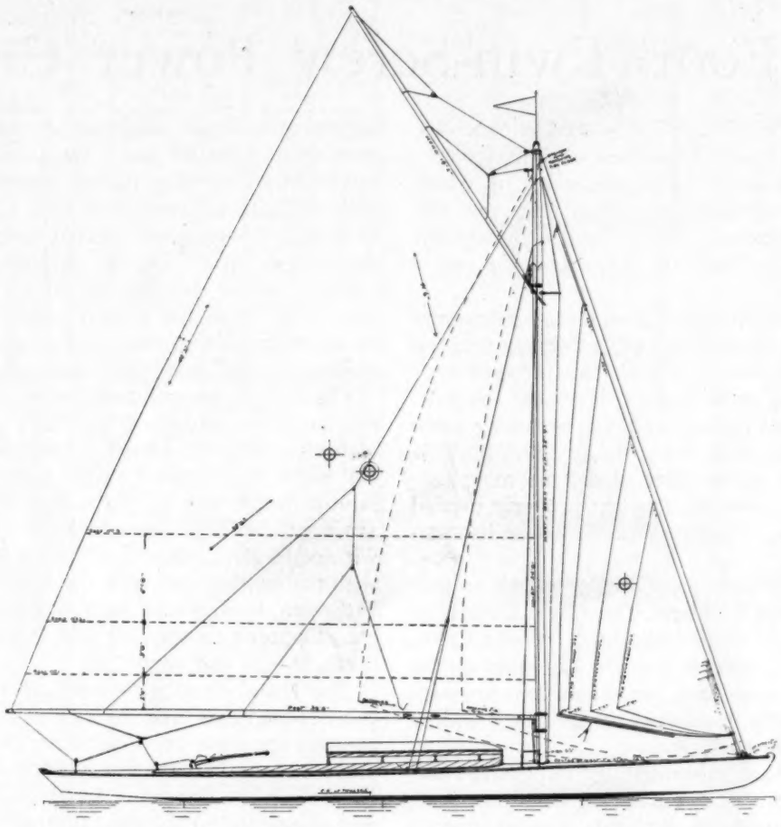
22 feet 9 inches on the waterline;

10 feet 6 inches beam;

2 feet 6 inches draft, without board.

She carries 1,600 pounds of outside lead in her keel, and has a sail area of 869 square feet.

In designing this boat, the architect has made a radical departure from the design of his former "P" boat Alga, which was the champion of her class in Great South Bay in 1908. The boat is narrower, is drawn out longer, has a fuller body and wider deck forward, with a narrower stern than the Alga, while the sail area is about the same. The boat is an out-and-out racer, having, however, a summer cabin such as is common on Great South Bay, with sleeping transoms on either side and a table hinged to the centerboard trunk.



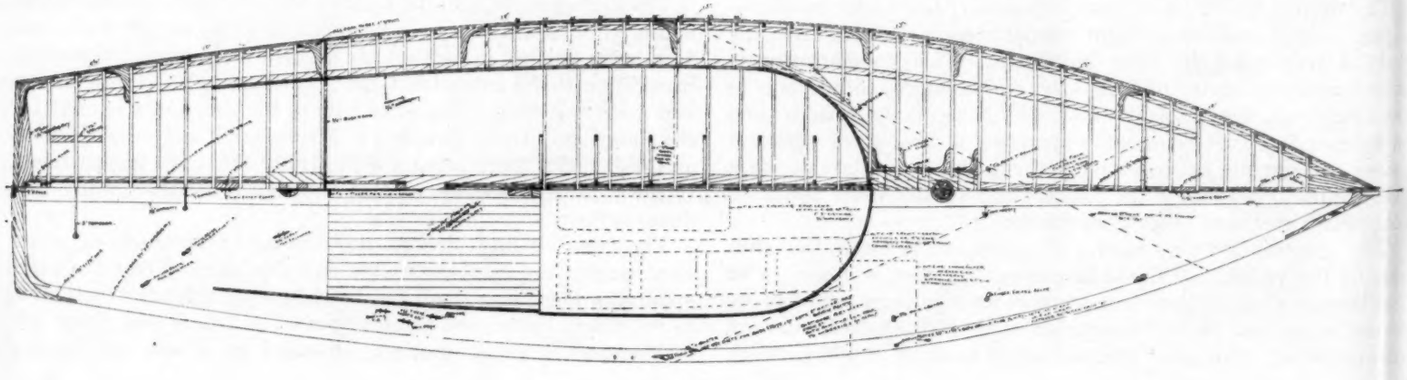
The craft is well built and fastened, and the best workmanship possible has gone into her construction. She has a large, open cockpit and ample deck room. She should be an easy boat to handle while racing. The forestay sets in some 2 feet from the bow, giving her a large mainsail for driving power and a rather small jib. The sails are by Geo. W. Robinson & Co., City Island, N. Y.

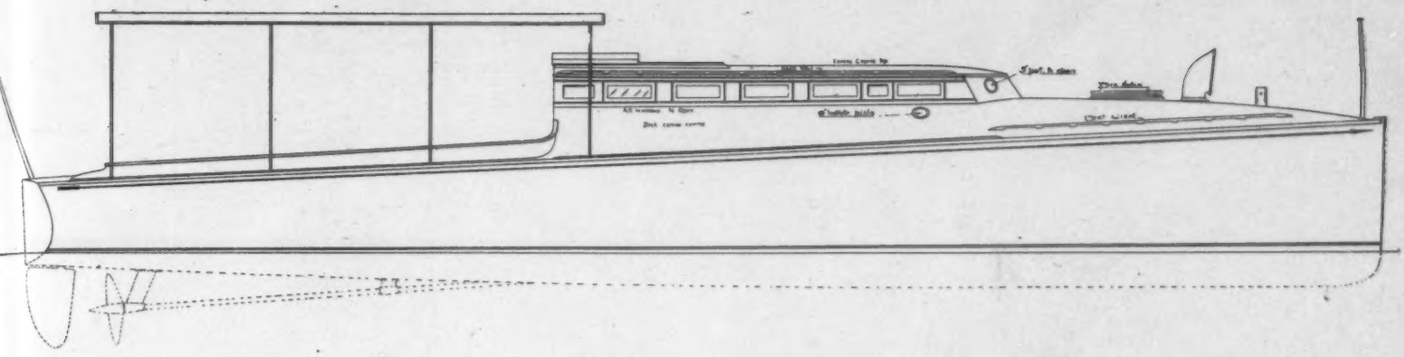
While the boat is flat—which, of course, is a necessity in a craft intended for shoal waters—she has good bearings, is well ballasted, and should carry her sail well, while there is nothing underneath her to hold her back.

The deck is canvas-covered, the deck beams and frames being spaced 10 inches, center to center. The planking is ¾ inch thick, the top streak being yellow pine, the garboards of oak, and the balance of cedar. The plank sheer is of mahogany. The boat is well fastened with tie rods and cross braces, and should prove exceptionally strong.

Mr. Leslie is a member of the Moriches Yacht Club, and will race the boat under the colors of that organization.

Mr. Connolly has designed a number of boats for Great South Bay that have been very successful, probably the best-known being the Bellport Bay Yacht Club's one-design class. This class has furnished excellent racing, and have not only proved themselves fast, but are extremely able. This year several new boats have been added to the class.





A Fast 40-Foot Launch for Ferry Service and Tender

APPRECIATING the advantages which the internal-combustion engine offers in the way of high-speed boats of moderate size which not only can be used for ferry service, but for tenders to larger yachts as well, Mr. H. S. Duell, of the New York and American Yacht Clubs, is having built a 40-foot launch from designs by Messrs. Bowes & Mower, of Philadelphia, Pa. This boat was designed primarily for ferry service between Yonkers and New York City, and for this reason a 6-cylinder, 100-horsepower Van Blerck engine has been installed, which is expected to give her a sustained speed of something over 20 miles an hour. In addition to using her as a ferry launch, Mr. Duell will also make use of the boat as a tender to his New York 30-footer Rowdy, for which purpose she is admirably adapted.

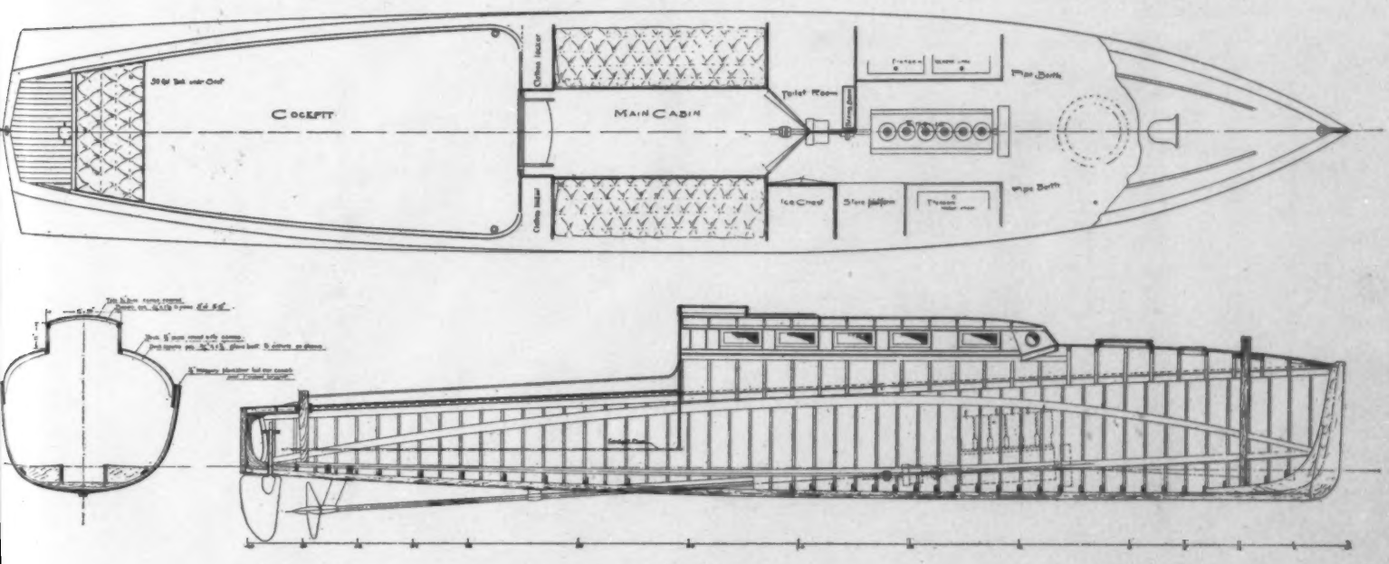
This boat shows many unusual and novel features, both in construction and design. The principal dimensions are as follows: Length over all, 40 feet; waterline, 40 feet; beam, extreme, 7 feet 2 inches; draft of hull, 1 foot 2 inches; draft to the bottom of propeller, 2 feet 8 inches.

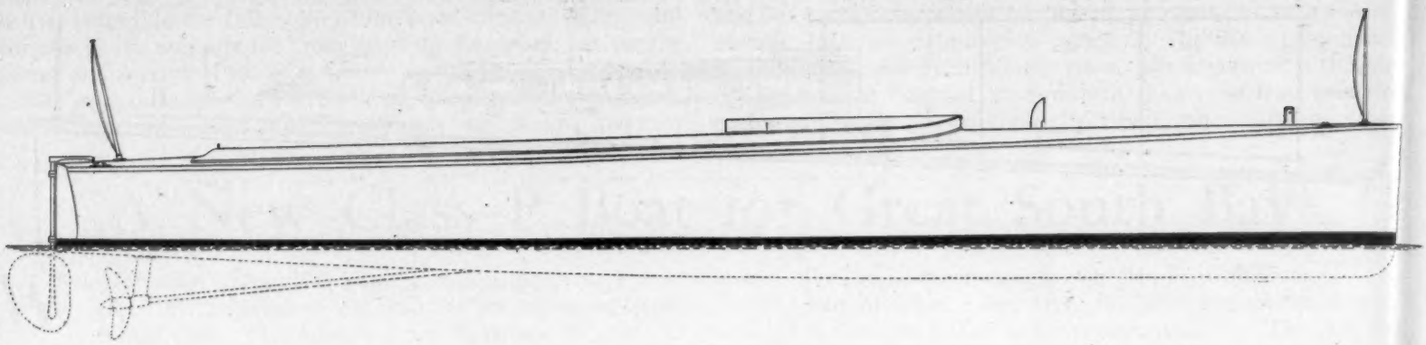
The lines are fair and easy, the 'midship section showing a rounded bottom with some deadrise, while the after sections are somewhat flat, the floor being carried well aft. The arrangement of the turtle back and cabin house is unique, and has the advantage of giving good headroom in the cabin without breaking the sheer line and without detracting from the looks of the boat. A long turtle deck extends from the stem nearly two-thirds of the length of the boat, from which rises a narrow trunk, pointed at the forward end, where it rakes aft slightly. Under this cabin trunk are located the saloon and engine room.

The main cabin is 8 feet long, and has a full-length transom on either side, with clothes lockers at the after end and a toilet room at the forward end on the port side. A door on the starboard side opposite leads into the combination engine room and galley. Entrance to this compartment may also be had through a deck hatch forward of the trunk cabin.

The cockpit is 13 feet long, and the floor is high enough above the water to make it self-draining. It is left entirely free for chairs, with the exception of a lazy-back seat across the after end. The boat thus combines not only all the essentials of a good day boat, but also has good accommodations for protection against the weather under all conditions. The cockpit is covered by a permanent awning on stanchions. There is a 50-gallon gasolene tank under the seat in the cockpit, allowing gravity feed to the engine. The boat is well braced with longitudinal stringers, and, while lightly built, will be strong and thoroughly substantial.

The owner expects to use the boat daily between his summer home and his office in New York, and will handle her himself. She is being built at City Island, and will be ready for delivery by June 1.





A Fast 32-Foot Runabout

SPEED seems to be the essential with the new runabouts that are being built this year, and for this reason the accompanying plans of a 32-footer, designed and now being built by Julius Peterson, of Nyack, N. Y., should prove interesting. The boat is exceptionally pleasing in appearance, and her lines indicate that she can be easily driven, giving exceptional speed for the power. The forward sections are sharp, giving an easy entrance, without too much flare, while the after sections are flat, with considerable tumble-home at the stern.

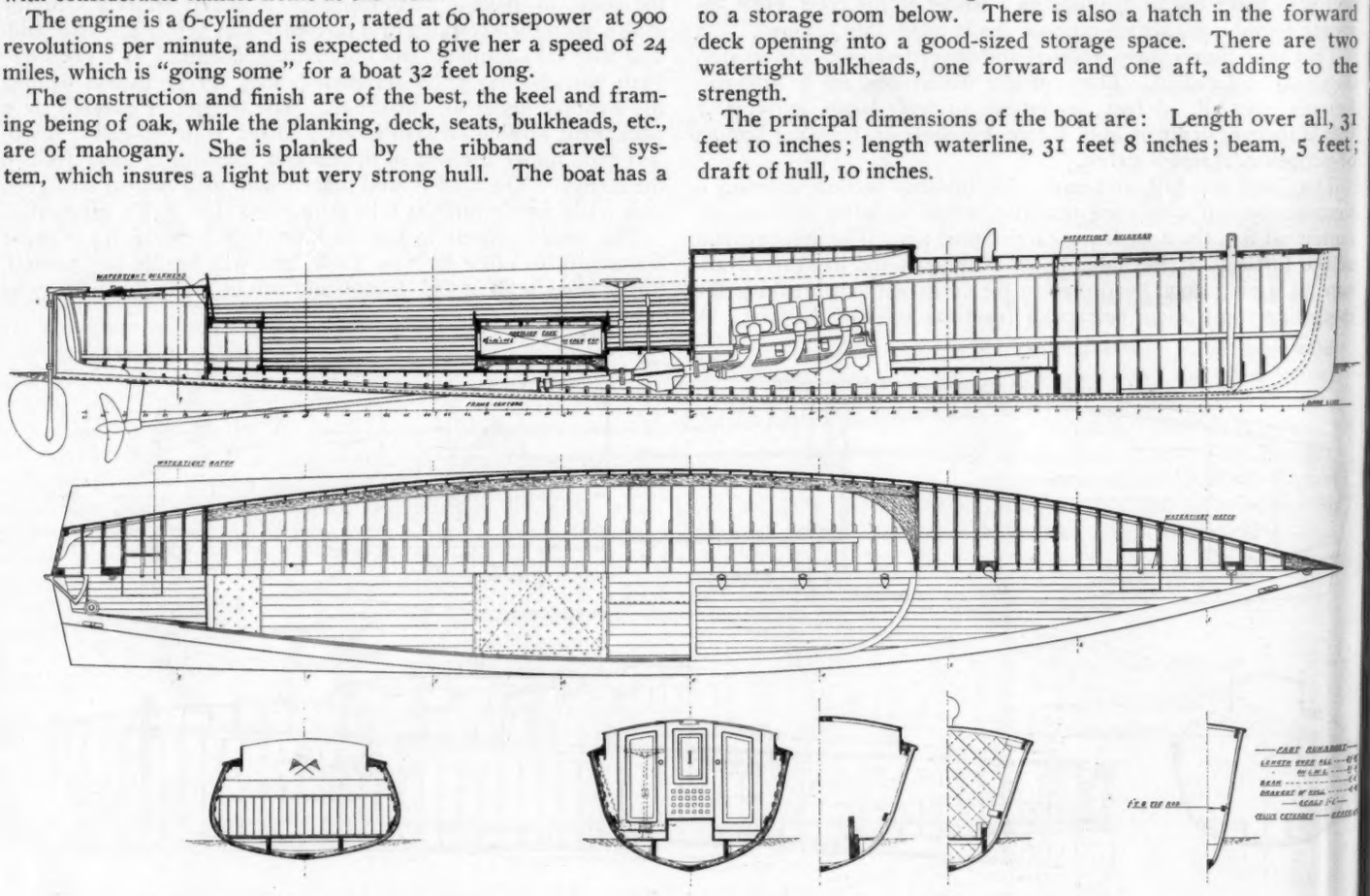
The engine is a 6-cylinder motor, rated at 60 horsepower at 900 revolutions per minute, and is expected to give her a speed of 24 miles, which is "going some" for a boat 32 feet long.

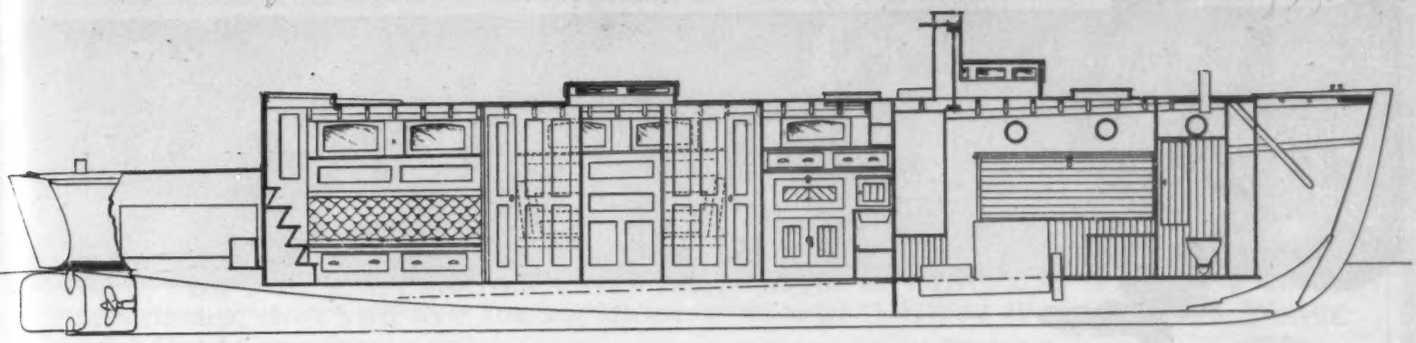
The construction and finish are of the best, the keel and framing being of oak, while the planking, deck, seats, bulkheads, etc., are of mahogany. She is planked by the ribband carvel system, which insures a light but very strong hull. The boat has a long deck forward, with a hatch fitting into the cockpit coaming at its forward end, and covering the engine, which is separated from the main cockpit by a bulkhead, in which is a door on either side. This hatch is hinged to raise, giving easy access to the motor.

The gasolene tank is located amidships under the steersman's seat, while the steering gear is between this seat and the engine bulkhead, with reverse lever and controls right at hand.

The after cockpit is open, with the exception of a seat across the after end. There is a good-sized deck aft, in which is a hatch to a storage room below. There is also a hatch in the forward deck opening into a good-sized storage space. There are two watertight bulkheads, one forward and one aft, adding to the strength.

The principal dimensions of the boat are: Length over all, 31 feet 10 inches; length waterline, 31 feet 8 inches; beam, 5 feet; draft of hull, 10 inches.

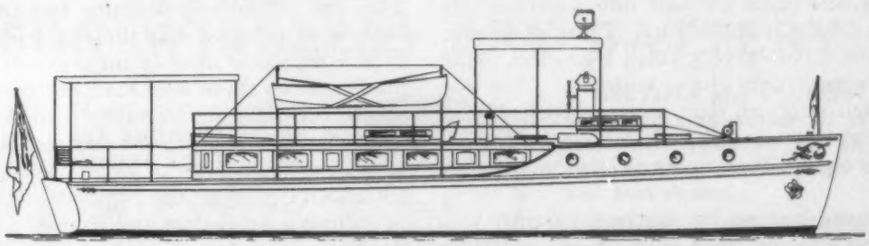




A 50-Foot Cruiser for Southern Waters

THE accompanying plans show a power cruiser designed for use in Southern waters from the board of Frederic S. Nock, of East Greenwich, R. I. The dimensions of this boat are: Length over all, 50 feet; beam, 10 feet 3 inches; draught, 2 feet 6 inches. The power plant comprises a 4-cylinder, 5½ x 7 engine, turning 600 revolutions per minute, which insures a speed of 12 miles in smooth water.

The interior arrangement is somewhat unique. The saloon is entered from a companionway in the after deck and contains two full-length wardrobes, a bookcase, desk, etc., and two extension berths capable of accommodating four persons. From the passageway leading forward there are two wardrobes on the port side and a Pullman type of stateroom, the beds of which, when made up for the night, afford ample accommodations for two persons, with space under the seats for the storage of the bedding during the daytime, when the seats can be made up and a table set. The doors at either end of the passageway being closed, allow the space in the passageway to be used in conjunction with the stateroom. There is also access to the bathroom from this stateroom. On the starboard side is a large bathroom, with two entrances, closet, tub, lavatory, linen locker, medicine locker, etc.



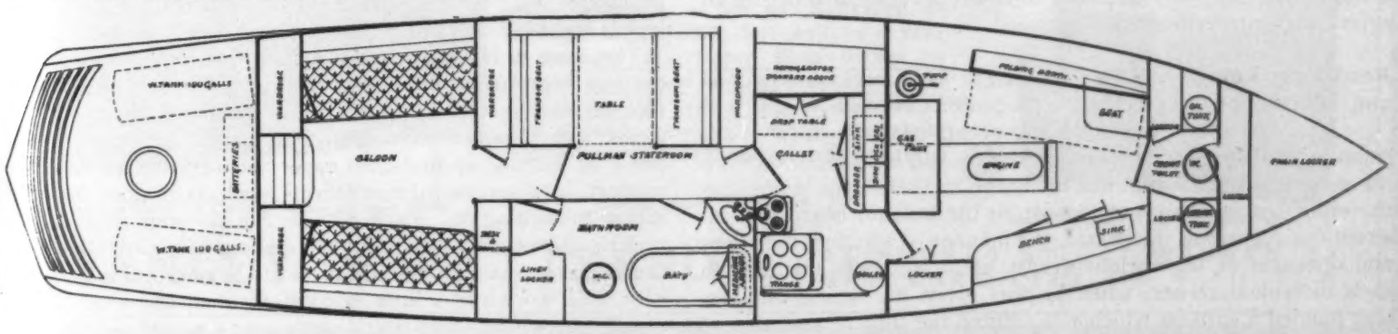
The galley is the full width of the boat, and is fitted with a four-hole Shipmate range, boiler for hot water, a small alcohol stove, dresser, sink, dish locker, large refrigerator, provision lockers, etc. The engine room and crew's quarters are forward. The gasolene tank is situated over the reverse gear of engine near the center of the boat, and there are tool lockers, clothes lockers, seat, sink, work bench, lantern lockers, etc. A good-sized toilet room completes the arrangement of the crew's quarters. The bilge pump is of the diaphragm type, with a 2-inch discharge pipe.

In this engine room is a folding berth for the paid hand, as well as a dynamo and switchboard, while the storage batteries are stowed under the after deck. Ample ventilation is secured in all parts of the boat by the ports, skylights, ventilating cowls and drop sashes. In the fore peak are two tanks, one for alcohol and the other for lubricating oil.

The plans show that all available deck space has been utilized, the entire raised deck and cabin trunk being protected by a railing, as well as the main deck. Steering gear and engine control are located on the raised deck forward, directly over the engine. Two tenders are to be carried on davits. The searchlight is to be set on awning frame, where it can be easily controlled, if desired. For cruising in Southern waters in any season of the year this boat would be hard to beat for a craft of her size, combining, as she does, seaworthiness, light draft, good speed and excellent accommodations for a party of five or six.

Two 100-gallon water tanks are located under the after deck, giving ample water supply for extended cruising. The after deck is flush, and, with the railed deck on top of the trunk cabin, gives her a great deal of deck room without in any way taking away from the accommodations below. Great attention has been paid below to get an arrangement that insures maximum convenience in those quarters that contribute much to the comfort of those aboard ship. The galley is exceptionally large and well found, the bathroom is roomy and well fitted, while the amount of locker and wardrobe space is sufficient to satisfy the most exacting.

There is a windlass on the forward deck with stockless anchors, housing in the hawse pipe, minimizing the labor of handling ground tackle. A small awning forward covers the steering bridge, affording protection from the sun.



EDITORIAL

Published by the Yachting Publishing Co.; Oswald Garrison Villard, President; Herbert L. Stone, Secretary and Treasurer

Overdoing Lightness in Speed Boats.

Once, two or three years ago, on a Western river, a new type of motor boat appeared at one of the regattas frequently held in that section. I was there, and received for the first time an inkling of what we might expect when the motor boat racing game had fully come into its own. Everyone for miles around was out, the city was decorated with flags, and the placid river resembled the famous Thames during Henley Week. There was as much enthusiasm and as much excitement as at a baseball game; and when you say that you have sounded the depths of word-picturing—in this particular instance at least. But that was not what I wished to talk about. It was the curious boat that appeared—quite unexpectedly, it seems, and more or less of a dark horse. As to that, we never were quite able to tell, for the reason that, in coming up to the float, she stuck her bow into a particularly high wave and the bow simply crumpled up. There may have been a log concealed in the wave—a very small log. But, at all events, the potential cup-winner went out of business. That was because she was not much stronger than a paper boat, a boat really with just enough substance in her hull to float the engine. And so that wave, or that log, as the owners claimed, did not do a thing to her!

I call this instance to mind because her lesson apparently was not as significant as some believed; that is, if we are to judge from reports of new racers coming out this year, which are built to the limit of lightness and many of which will undoubtedly not go through the season without some serious damage to the hull. A 30-foot or 40-foot boat, built of cigar-box thickness, is too light to hold the power that is put into it with safety. The whole question of speed seems to be in the matter of the lightest possible displacement and greatest power, and in pursuit of this designers and builders are often apt to overlook another very important factor—safety and dependability. I am not advocating inch planking for racing purposes, because lightness is essential; but the history of motor boat racing has been one continual chapter of unreliability, both as to engine and boat, and hardly a race is run that does not see one or more of the competing boats retire from structural defects of hull or engines. The old Dixie was a remarkable exception to this rule, and where sufficient attention is paid to the design of the hull it would seem that heavy enough material could be put in to insure a reasonable degree of safety without detriment to the speed.

Read Your Rules and Instructions.

One day last fall I had occasion to act as an official at a power boat race, which was one of the big events in that section of the country. Most of the boats in the regatta had been raced through the season, and the committee in charge had taken the precaution the night before the event to post on the bulletin board full instructions regarding the course, the manner of starting, the times and distances of the various events, etc. Not only this, but to each individual owner, when he was given his racing number, was handed a card on which was printed the time of the start of his class, the various starting signals, the length of the course, and all information that was necessary to know; yet when the committee boat took its station it was immediately surrounded by a squadron of competing boats, the crew of each firing fool questions at the committee between the popping of the exhausts. Without an exception, the answers to all of these questions were contained in their printed instructions, and should have been known to every man who had ever been in a race before.

Something of the same conditions obtained at the finish of the race, when every boat owner shoved his craft alongside the committee boat and wanted to know where he finished, not taking into consideration the fact that the handicaps and corrected times had to be figured before the results could be announced. This condition of affairs is probably due to the fact that most motor-boat owners have not had much experience in the racing game. They are undoubtedly learning fast and in a few years' time will become so familiar with the racing routine that such conditions as now prevail at most of these events will not be seen. But for the benefit of those who have not done much racing, let me impress upon them the necessity of making it a point to read over carefully your instructions and obtain every bit of necessary information regarding an event before you leave the club float. Then don't go near the committee boat, but save your energies to getting a good start and having your boat under way and on the line with the crack of the gun.

Do Your Share.

The open season of boating is now on in earnest, and it is up to the individual boat owner whether or not it is going to be the best and most interesting season the sport has ever known. Practically all of the activities in the boating world center in the yacht clubs, and the sport is held together and fostered by these clubs and by the various races which they promote. It has always been the experience that in most clubs the majority of the members are "dead ones," as far as any active efforts on their part are concerned, leaving the bulk of the work to a few active ones, who happen to be the officers or unfortunate members of some of the various committees. This work is done without any remuneration, and solely for the good of the cause by those doing it. Not only do the "sojers" contribute nothing to the necessary work, which must be done by the regatta committee, house committee, grounds committee, etc., but they are right on hand with a growl and a kick if anything does not go just as they think it should.

The same is true, in a large measure, as regards races. The average boat owner will not go into a race unless he figures out that he has a pretty good chance of finishing "in the money." Clubs and regatta committees that go to the trouble and expense of getting up first-class races and regattas are entitled to support, for a successful race reflects much credit upon the organization promoting it. Each of you can do your share towards making these events successful and making your club known as an organization to which you are proud to belong. Don't be afraid of a little work and a little discomfort; and, above all, don't be afraid to read the other boat's name over a racing course.

Don't run YOUR Boat this Year without a Patterson Wireless Battery Holder!

Of course you need a Waterproof Battery Box!—that's admitted by everybody now-a-days! Don't say,—"My batteries are in the cabin and never get wet in there," for you must realize every foggy night or rainy day when the cabin feels damp, that you are losing Battery energy, unless they are in a Waterproof Cabinet—

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is as easy as putting in a half dozen Incandescent Lamps — and though done quickly, it can't be done wrong by the most inexperienced person; individual cells may be tested with Ammeter without removing Cells from Holder.

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Send for Bulletin 37

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STANLEY & PATTERSON, 23 MURRAY ST.—27 WARREN ST NEW YORK CITY, N. Y., U. S. A.

Driftwood from Along Shore

Canada and the Coming Season

HO, ho! for the "deep nine" and the "mark seven," and the blue ooze on the tallow arming of the hand lead that tells you she's smelling good holding ground! Ho, ho! for the overhauling of the running gear in the second dog watch, when the Old Man growls: "See everything clear before dark!" Ho, ho! for the long, white furrow of the seething wake, and horizon empty of all but sea and sky! For the Royal Canadian Yacht Club, following the impulse of the YACHTING articles on long-distance racing last summer, has cut loose from precedent and provided for off-shore, out-of-sight-of-land racing this season.

In addition to the usual 'long-shore cruising races for Lake Ontario, the schedule of this club, the biggest on fresh water and one of the largest in the world, provides for several races straight across the lake to Yankeeland, and for still others in which the lake has to be crossed twice ere the contestants shoot up into the wind to smother their light sails after crossing the finish line.

The Nicholls Gold Cup has been sailed for year after year around a triangular course in Lake Ontario opposite Toronto Harbor, but this Dominion Day the contestants will be sent clean across the lake and back, the turning point being the bell buoy off Niagara River. It is a generation since such a course has been sailed out of Toronto, and the majority of racing skippers are still rubbing their eyes over the change; but it's one that is bound to do good and teach more of the compass, the chart and the lead than a dozen navigation lectures.

Then, again, on August 5 the Royal Canadian Yacht Club's programme contains a cruising race from Toronto across the lake to Port Dalhousie, thence back across the lake to Oakville. This is a decided novelty in a course for a cruising race, and again provides the amateur tars with plenty of off-shore sailing and compass steering, for in both races mentioned there will be very little in the way of shore marks to steer by for the greater part of the contest. The distances are not great in either case, but their arrangement makes a good wholesome race. From Toronto to Niagara is about 28 miles, east-south-east. From Toronto to Port Dalhousie is 31 miles, south, and from Port Dalhousie to Oakville is about 35 miles northwest.

The Royal Canadian Yacht Club's programme contains a good number of other cruising races, as usual, along the north shore of Lake Ontario to Oakville and Hamilton, and across the lake to Port Dalhousie and to Olcott, N. Y. The cruising races, however, as arranged, have this drawback, that they are confined to classes above Class Q, which debars the little fellows from taking part in the fun. In connection with the Nicholls Gold Cup contest provision is made—for the first time in many years—for a schooner race, providing there are three starters in this class. The Royal Canadian Yacht Club's anchorage now fairly bristles with the lofty spars of "fore'n'afters," the schooner fleet including J. C. Eaton's Tekla, Æmilius Jarvis' Zahra, George H. Gooderham's Oriole III (Azara), and Sidney Small's Clorita—all schooners that have made a name for themselves on salt water before coming to the lakes. The development of big-boat sailing and long-distance racing is plainly marked around the Royal Canadian Yacht Club, one of the outward and visible signs being a posted invitation for unattached lovers of the sail to leave their names with the commodore for a location among the amateur crews of the larger yachts, so as to avoid the embarrassment of contestants finding themselves short-handed on the eve of a race. It's a good move, for it enables many young fellows to get experience outside of the sailing of skiffs and dinghies, and encourages skippers to go in for the handling of big craft on other than mere pleasure jaunts.

And what else is on the programme of the sailors of the sweet waters of the Great Lakes and the mighty St. Lawrence? Much, beyond the ordinary club schedules of events. Canada has been challenged by the Crescent Yacht Club of Watertown, N. Y., for the George Cup, the Class R trophy wrested by Swamba of Toronto at Kingston last year. The international challenge throws the contest open to all comers from both sides of the line, and Toronto may have to meet challengers from Kingston, Bellevile, Rochester and Hamilton, as well as the Watertown clipper, when the contest is sailed during the week of August 28 to September 3 at Toronto. That will be a great week, for during it the Royal Canadian Yacht Club must also defend the Fisher Cup. It has also been arranged to hold the regatta of the Lake Yacht Racing Association at Toronto during that week, so that a fleet of thirty or forty boats will probably be brought together from all over Lake Ontario and part of Lake Erie, the Lake Yacht Racing Association being an international association.

There will be no Canada's Cup contest for 1911. The time for sending a challenge—ten months before the contest—has expired. But there may be one in 1912. The Royal Canadian Yacht Club and Rochester Yacht Club are both resolutely on opposite tacks regarding the eligibility of Seneca for Canada's Cup racing, and until she is dropped out of the question it looks as though the Rochester people would keep the trophy that was intended to do so much towards developing lake yachting. But the meeting of the Yacht Racing Union of the Great Lakes at Detroit showed indications that a rapprochement would be attempted, possibly on external initiative, in time for a contest for 1912.

The Fisher Cup race will be the chief international contest on fresh water, however. Seneca is the challenger, and either Crusader, Eleanor (ex Adele) or Kayak (ex Aileen) the defender. Of the three to-day Crusader, a Fife-designed sloop, is generally conceded to be the fastest, although she was rejected in favor of Eleanor at the time of the last Canada's Cup contest. Kayak, too, has shown more speed of late than she did when she was a cup candidate. The battle among these three for selection as defender will be almost as good a feature as the final contest. Seneca walloped Eleanor easily in 1907, but was beaten twice by Crusader in 1909 at inter-club regattas. She was sailed then by her new owner, Eric Moore, of Rochester, and he had not learned her tricks. He knows her better now, and it is possible that Addison G. Hanan, who steered Seneca to victory in 1907 on Lake Ontario and in 1908 on Long Island Sound, may sail her again at Toronto. He would prefer that a Rochester man did it, but as he is a member of the club he may be called on. For the defender Æmilius Jarvis is looked upon as the inevitable skipper—and a Jarvis-Hanan match is sure to be a battle of giants. Although the challenge expressly stipulates that the contest shall be between Canada's cup boats of 1907, it is possible that it may be modified so as to bring in a couple of new Class P craft. With this in view a Toronto syndicate is preparing to get a new boat from Owen's design, built in Boston, and Rochester may counter with a Herreshoff craft. The rules of the game will permit this; but although Owen is well known and liked in Canada—he was in business at Hamilton, Ont., for several years and turned out some very successful boats—such a move on the part of the challenged robs the contest of half of its international significance and does nothing whatever towards developing local talent in designing or building. Indeed, the tendency in Canada has gone so far to the other extreme that even the Royal Hamilton Yacht Club's candidate for the Walker Cup, a little skiff trophy, has to come from Linton Hope's English board!

C. H. J. SNIDER.

What Chesapeake Bay Yachtsmen Will Do this Season

The outlook for yachting and motor boating on Chesapeake Bay is more encouraging this year than in a long time, for not only are there more new boats being built, but the club men are taking a keener interest in the sport. The Maryland Motor Boat Club is already making arrangements for a motor boat race between Baltimore and Norfolk. While the details have not as yet been settled the race will be open to boats from any recognized club along the Atlantic Coast.

The Maryland Motor Boat Club has kept interest alive all through the winter by holding a series of dances at the clubhouse. This has brought together the members and their friends and has materially added to the membership.

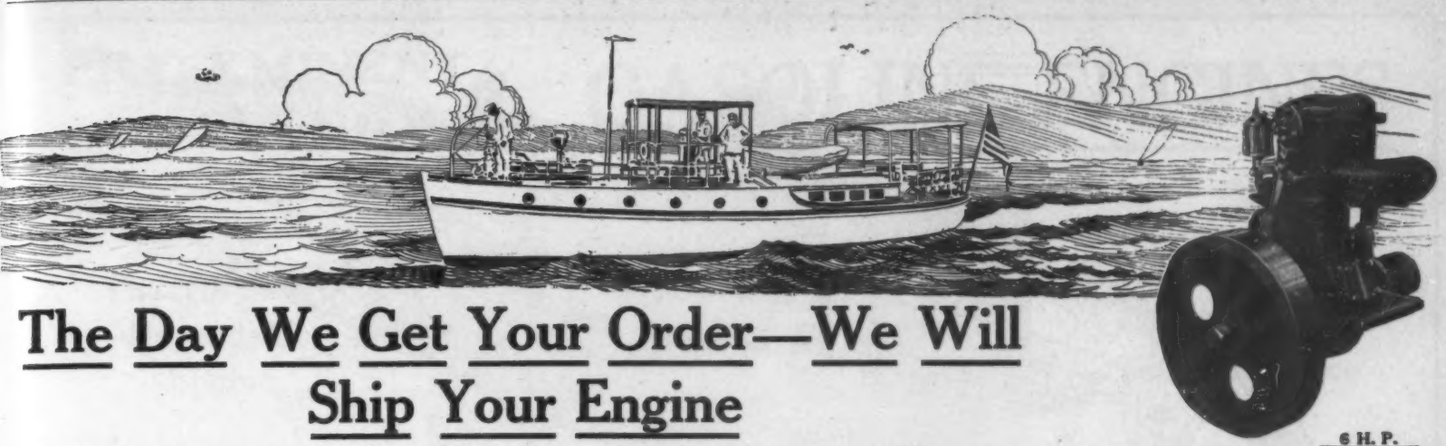
The Baltimore Motor Yacht Club, too, has been active, and they anticipate holding a series of speed boat races during the summer. This club has received from a number of Philadelphians a proposition to hold a carnival at Betterton during the summer, and to hold a series of motor boat races there. The Baltimore Yacht Club has been inactive during the winter, following its annual custom, but the club will open as usual in June, and the members will devote themselves to sailing regattas, especially in the cruise of the Chesapeake Bay Yacht Racing Association. The re-election of Dr. Isaac E. Emerson as commodore insures a season of gaiety and entertainment.

The Corinthian Yacht Club has a syndicate that is looking for a Q class boat with which to defeat, if possible, the Eleanor of the Baltimore Yacht Club. Mr. J. H. Robinette, who is the commodore of the club this year, is at present without a yacht, but he expects to fly his flag from the truck of a 50-foot yawl for which he is now negotiating.

The formation of the Cambridge Yacht Club, with Mr. Alfred I. Dupont as commodore, will increase activity on the Choptank River and will keep company with the Chesapeake Bay Yacht Club, which has its headquarters at Easton. The new club will come into the association and it will, it is understood, go in for motor boating more than sailing.

The re-election of Mr. R. A. Dodson as commodore of the Hampton Roads Yacht Club and of Dr. W. W. Grier of the Capital Yacht Club is an assurance that both organizations will take a continued interest in the racing of sailing craft.

The annual regatta of the Chesapeake Bay Yacht Racing Association will be held during the ten days beginning July 16, when the fleets of the



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6 H. P. "Perfection"

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We want you to consider this name "Perfection". It was not given to our motor carelessly or because someone had a sudden idea. We call our engine the "Perfection" because we believe this word most adequately describes it, conveys to the mind its distinct character. Every part of the "Perfection" is *perfection* itself—brought to a point where it is impossible to improve. There is nothing to get out of order, nothing to pile up repair bills. Some of our users have written us that they have run "Perfections" for years without a penny spent for repairs or overhauling. Some of these men were green hands at motors when they began using "Perfections." But anyone—man, woman or child—can run a "Perfection" without the slightest difficulty. It starts easily. Requires very little attention. A free flow of gasoline and a good spark and she keeps the boat hustling along mile after mile at a great old rate. There are no heavy vibrations. You are not disturbed by strong "pounding." The "Perfection" has a smooth even purr that is pleasant to the ear, that gives a sense of speed and power under marvelous control and being delivered in the efficient and economical way.

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We have a strict rule in our factory from which there is absolutely no appeal. Every part must be inspected. From the time the metal is shaped until the finished parts appear experts watch closely every move of the workmen. Every minute every item is scrutinized. Not a detail escapes notice. Everything that goes into a "Perfection" has to be perfect and if it does not measure up to our standard it has to be done over. We have another rule—a real **law** in the Caille factory—and that is that every engine must make good under a working test before shipment. Each "Perfection" is put to work turning a propeller in a tank of water and it has got to "show us" that it will do more for you than we claim it will—that it will always test above the specifications.

Free Book For Boat Enthusiasts

HERE is another place where we have spread ourselves. Of course, we know that no book can do the "Perfection" justice but we believe the book we have produced to be worthy of the great motor. It describes it and pictures it to you in a way that must impress you with the features described above. In this book we go into details. We show you that we build in 2, 2½, 3½, 4, 6 and 8 H. P. in the single-cylinder engines; also 7 to 30 H. P. in the 2, 3 and 4 cylinder engines. We tell you **how** we are able to get the prices down so low—from only $40 to $450 according to type and horse power. Write today for this book and let us send you, as well, the name of our dealer nearest you and the letters described above. Do not fail to send us the coupon below today so that you can get this important information right away.

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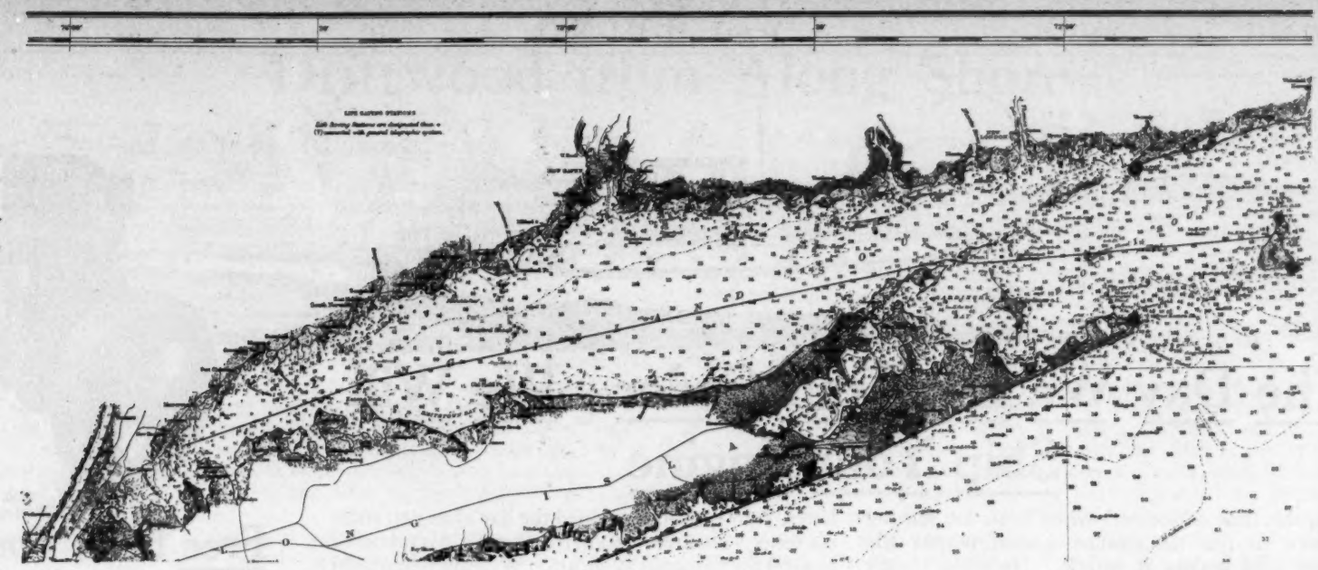

CHART OF THE COURSE TO BLOCK ISLAND IN THE NEW YORK ATHLETIC CLUB RACE FOR POWER AND SAIL BOATS.

various clubs of the organization will rendezvous at Oxford, Md. The following day the annual races of the Chesapeake Bay Yacht Club will be held, and in these events the sailing and motor craft of the association will participate. The next day will be "reception" day, when everyone will gather at one of the picturesque manors in the neighborhood. On July 18, the fleet will sail to Cambridge, eight miles away, to be the guests of the Cambridge Yacht Club, which will hold a series of motor speed boat races.

The day following the fleet will sail for Norfolk, power boats and sailing craft racing in their respective classes. This race will be divided into three days, the first to Solomon's Island, the second to the Rappahannock River and the third to Hampton Roads. At Norfolk the yachtsmen will be the guests of the Hampton Roads Yacht Club. There will also be a series of races that will occupy the two days after arrival.

From Norfolk to Baltimore there will be a straightaway race for the cruising powerboats of the fleet, while the sailing vessels will make the 187 miles in easy stages, though they will race from port to port.

Among the new craft being built for Baltimoreans are: A 30-foot raised deck cruiser, with an 8-horsepower Fairbanks motor, for Mr. Roger Broome; a 30-foot raised deck cruiser, with an 8 to 10 horsepower Bridgeport motor, for Mr. Chester B. Lewis, and a 40-foot glass cabin cruiser, with a 20-horsepower motor, for Mr. B. A. Peusch. Among the new boats added to the Baltimore fleet this spring are a 43-foot raised deck cruiser, the Leonora, purchased in New York by Mr. Jacob Mayer of the Maryland Motor Boat Club. She is driven by an 18 to 25-horsepower motor, and she will be entered in the Baltimore-Norfolk race. Mr. A. Stanley Zell, of the Baltimore Motor Yacht Club, has purchased the 60-footer Madegare II from New York parties. She is equipped with a 40-horsepower motor.

A new speed boat that is arousing interest is being completed by Mr. C. E. Chance of Annapolis. It is 26 feet long and has a 100-horsepower Emerson motor.

Baltimore motor boat men are discussing the possibility of holding a motor boat show next winter. The several automobile shows have been great successes, and it is felt that a motor boat show can be held with profit.

STUART STEVENS SCOTT.

The Season on the Lower Lakes

New boats, new contests and new sport-boosters have been springing up in such profusion at the lower end of Lake Erie in the last few months that it looks as if the season of 1911 would be unique in the history of pleasure sailing on the waters thereabouts. Motor boats, by sheer numbers, have taken a very large share of the interest, but let it be known right here that the pick of all those who love to hear canvas flap, and feel the sway of good hemp strains, are true to the windjammer game, and the sail boats will not be far behind the "put-puts" in the season's doings.

Dozens of new boats have been added to the fleets of the three larger clubs at Buffalo, and the tendency is toward high-speed boats. Most of the new ones will exceed the 25-mile mark, and some very high speed is expected. The speed boats will have ample opportunity to show their capabilities, for the number of contests will be larger than ever before, and there will be races for boats of all kinds.

The E. R. Thomas Trophy race for the championship of the Great Lakes will be held on the Niagara River September 9, under the auspices of the Motor Boat Club of Buffalo, and it will bring speed boats from all over the East. No accurate list of the contestants can be given at this time, but among the boats mentioned are Dixie IV, owned by Frederick K. Burnham, some Palm Beach winners, and a number of local boats.

The Hower Trophy race, to be held under the direction of the Buffalo Yacht Club, will again be one of the principal events of the season. Last year the club, which is primarily a sail boat organization, pulled off some motor boat races that made all the clubs entirely devoted to that line sit up and take notice, and it is whispered that the success of last year will be only a shadow to what is to come.

The Buffalo Launch Club has arranged a series of races for June 24, which will bring out some fast boats and a great deal of good sport. One of the first events will be a free-for-all scratch race, 20 miles, for a handsome trophy. It will bring out most of the local fast ones, including Commodore Vandervoort's new speed boat Whiz III, a new flyer built this spring by the Wickwire Brothers, La Truda, Courier III, Arab III and H. & S. There will also be a 10-mile race open to boats of 28 feet and under, and powered with 25-horsepower engines. Among the possible entries for this race are Iris, a new boat owned by Charles Alt, El Fralo, owned by A. G. Hoefler, U-U and Nosidda.

Another Launch Club event will be the Franklin Cup Race, to be run during August, the trophy having been presented to the club by Miss Irene Franklin of vaudeville fame. It will be an obstacle race open to all boats, and it will be held on the Niagara River, finishing in front of the Launch Club.

In addition to these events and numerous others there will be several long-distance contests. Chief among these will be the Scripps cruise, a contest on the lines of the Glidden tour for automobiles, for the handsome trophy presented by Commodore William E. Scripps of Detroit. Buffalo takes special interest in this contest because of the fact that the cruise will finish at Grand Island. It is also probable that several Buffalo boats will enter, as well as boats from Cleveland and other Lake Erie ports.

Aside from racing the outlook for the season is decidedly roseate. All the clubs report increased membership, and the percentage of "verandah sailors" is becoming less all the time as the love of the sport gets into their blood, and they forsake their easy chairs for a place at the wheel. Numerous improvements have been made at all the clubhouses and several new features added, such as the marine railway, built by the Buffalo Yacht Club. In short, if 1911 makes good half its promises it will be the most successful season the sport has ever known on Lake Erie waters.

C. B. MCCUAIG.

The Block Island Races

The eighth annual Block Island race for sailboats and the fourth annual power boat race to Block Island will be started on Saturday, June 24, and it looks now as if as large a fleet as ever will make the 100-mile journey to the island off the Rhode Island coast. It is eight years ago that the Block Island race for sailboats was started, and in the intervening years it has grown to be the small boat classic of the East, and probably more pleasure is had in the annual jaunt to "Blockers" than in any other event.

The power boat race for the Thomas Fleming Day Cup was started four years ago, and by the conditions the prize must be won twice by the same owner to become his property. The winners were, 1908, Erenol, S. Cochrane, owner; 1909, Martha, P. Kossek, owner; 1910, Elmo II, F. D. Giles, owner. It is open to cruising boats enrolled in any recognized club, of not less than 25 nor more than 40 feet over all, with greatest water-

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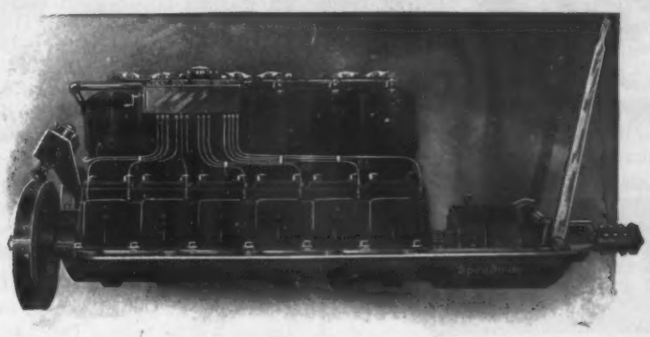

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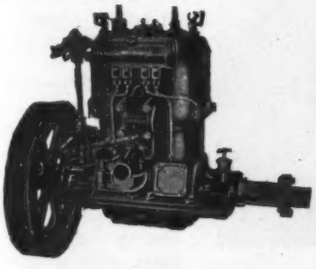

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NEW YORK

line beam not less than one-fifth the water-line length. The course is a particularly good one for power boats, the distance being 100 nautical miles, practically straightaway, and the running time being from 11 to 13 hours. The race starts at 5 o'clock in the evening, so that it is a night run down through Plum Gut and across Block Island Sound, arriving soon after daylight the following morning.

The general conditions of the race are given below. Entries close June 20, and entry blanks can be had from the yachting committee of the New York Athletic Club, H. A. Jackson, Jr., 409 Pearl Street, New York City, being chairman:

POWER BOAT RACE

Course—From Whortleberry Island to the west harbor of Block Island, disregarding buoys. Distance, 100 nautical miles.

Starting Line—Between two boats flying club flags anchored to the east of Whortleberry Island.

Finish—Leave committee boat (flying club flag and at night a red and white light) inside of west harbor on either hand.

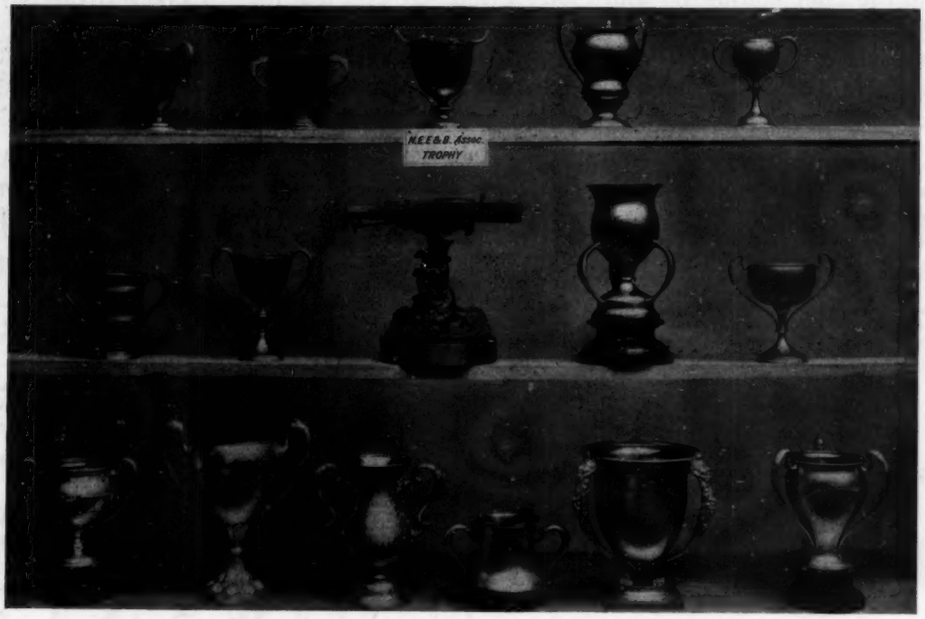
Crew—Shall consist of not less than three. In the event of the owner not being on board he must be represented by a member of a recognized club.

Power—Boats must be propelled by explosive engines, operated by gasolene, kerosene or alcohol.

Time Allowance—Under the 1909 rules of American Power Boat Association, with full time allowance.

Measurement—Certificates by a measurer of a recognized club, or reputable naval architect, must be in hands of committee not later than June 20, and no unmeasured boat will be allowed to start.

The sailing race starts at 11 A. M., and is over the same course, the measurements being based on over-all length. The time allowance is 10 minutes per over-all foot for the course, with an additional 5 per cent for auxiliaries and 5 per cent for yawls. Steamers leave Block Island daily, making connections with New York City and other points.



TROPHIES FOR NEW ENGLAND ENGINE AND BOAT BUILDERS' ASSOCIATION REGATTA.

Annual Regatta of N. E. E. & M. B. A.

The annual meeting and dinner of the New England Engine and Motor Boat Association, held in Boston, Wednesday evening, May 3, was fully attended, and was one of the liveliest meetings the association has ever held. The report of the regatta committee on the July 4 motor boat races in Boston harbor was very encouraging, and from present indications it looks as though this would be one of the most successful events which has ever taken place in the East. Many handsome trophies have been donated by members of the association, and the association itself has had a magnificent bronze trophy cast of very appropriate design, valued at $200, to be competed for, and an additional cash prize of $100 to the boat making the fastest time. A large number of entries have already been received. An effort is being made to interest owners of speedy "gasolenes" and favorable replies have been received. This contest should prove a most interesting event, and it is expected that the entry list will be of unprecedented size.

The start for Class C will be at 10:30 A. M., and for Class B at 2:50 P. M. The classes are: A, racers, 32 to 40 feet, load water line; B, racers under 32 feet, load water line; C, racers where rating exceeds 65; D, racers where rating is less than 65, but whose actual speed is greater than 12 miles; E, cruisers, 40 to 60 feet over all; F, cruisers, 28 to 40 feet over all; G, cruisers under 28 feet over all; H, open boats whose speed is between 8 and 12 miles; I, open boats whose speed is between 6 and 8 miles. Hydroplanes of more than one step excluded from classes C, D, E, F, G, H and I. Cruisers must have extreme beam greater than 1-7 length over all in Class E, and greater than 1-6 length over all in Classes F and G.

The start will be between the judges' boat and mast on the floating life-saving station, thence to red spar buoy No. 2, leaving it to starboard; thence to black spar buoy No. 1 off the east end of Thompson's Island, leaving it to starboard; thence to red spar No. 4 off Nut Island, leaving it to port; around mark boat off Pig Rocks Beacon, leaving it to port, between red and black buoys off Harry's Rocks to black can buoy No. 1 off Bumkin Island shoal, leaving it to port; through Hull Gut to black spar No. 1, to eastward of Hospital Shoal, leaving it to port, to red spar No. 2, westerly end of Long Island, leaving it to starboard; to black spar No. 1, easterly end of Thompson's Island, to red spar No. 2, leaving both to port, to finish line; covering this course twice for Classes A and B, once for all other classes. Distance around once, 14½ statute miles. Classes A and B, round both life-saving station and judges' boat, leaving them to port the first time around instead of crossing line. The regatta committee consists of Norman L. Skene, chairman, Bedford, Mass.; Chester I. Campbell, Arthur N. Dodge, A. P. Homer and W. B. Stearns.

Fourth Annual Regatta of the Mississippi Valley Power Boat Association

The fourth annual regatta of the Mississippi Valley Power Boat Association will be held at Dubuque, Iowa, under the auspices of the Dubuque Motor Boat Club, July 3-6, inclusive, and promises to be, as it was last year, the biggest event in the West, and will probably see more boats of high calibre than any event of its kind this year. Some of the boats that have been entered are: Commodore James A. Pugh's hydroplane, of which 55 miles an hour is expected; W. E. Hughey's hydroplane, from which 50 miles is looked for; Whitlock's Hoosier Boy; the new Dixie IV, of Commodore Fred. K. Burnham; Albert E. Smith's Kankee, a 600-horsepower hydroplane; Vita II, the 500-horsepower hydroplane of J. Stewart Blackton, from which talk of 60 miles an hour is heard, and Eph, belonging to Carl G. Fisher.

Over $10,000 in prize money has been raised, and Dubuque is planning for the biggest affair of its kind ever held. Grandstands are being erected having a seating capacity of 6,000. Following is the programme of the four days' event:

July 3—Reception of fleets from North and South.

July 4—Boat parade in morning, 1:00 P. M., Class K, open two-cylinder boats, D. M. B. C. only, 5 miles; 1:45 P. M., Class F, 20-foot championship, F. F. A., 15 miles; 2:30 P. M., Class B, part-cabin cruisers, F. F. A., 10 miles; 3:15 P. M., Class H, three-cylinder boats, F. F. A., 10 miles; 4:00 P. M., Class G, 32-foot championship, F. F. A., 20 miles; 4:45 P. M., Class, novelty race, F. F. A., 2 to 5 miles. End at 5:15 to 5:30 P. M. Evening—Grand aquatic fireworks display; illuminated boat parade.

July 5—1:00 P. M., Class J, canopy, half-cabin, D. M. B. C. only, 5 miles; 1:45 P. M., Class D, 26-foot championship, F. F. A., 15 miles; 2:30 P. M., Class L, clam diggers' novelty, 2 to 5 miles; 3:15 P. M., champ., 40-foot Western championship, F. F. A., 20 miles; 4:00 P. M., Class I, two-cylinder boats, F. F. A., 5 miles; 4:30 P. M., Class A, cruiser race, F. F. A., 5 miles. Evening—Grand aquatic fireworks display; illuminated boat parade.

July 6—1:45 P. M., special, cups only handicap of 20, 26, 32, 40 foot, 15 miles; 2:30 P. M., handicap of Class A, B, H, I, J and K, 10 miles; 3:15 P. M., exhibition 5 miles against time by champion of 40-foot class.

Prizes—40-foot Western championship, F. F. A., $1,000 Webb trophy; also special Dubuque $250 trophy; cash, $1,000, $250, $50. 32-foot, Class G., F. F. A., M. V. P. B. A., $150 Cup; also special $200 silver trophy; cash, $250, $75, $25. 26-foot, Class D, F. F. A., M. V. P. B. A., $100 Cup; also special $150 silver trophy; cash, $150, $75, merchandise. 20-foot, Class F, F. F. A., M. V. P. B. A., $150 Cup; also special Webb trophy, $150 value; cash, $400, $100, $50. Full cabin, Class A, F. F. A., M. V. P. B. A., cup;

(Continued on page 556.)

Don't Buy a Motor Boat

UNLESS YOU INSIST UPON HAVING A SEAMLESS STEEL SAFE, TANK

A Leaky Boat Is Pretty Bad But

A LEAKY TANK IS WORSE

Gasoline is mighty dangerous stuff, so when your Riveted Makeshift Tank springs a leak, and your boat is burning, just send us a wireless order

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FOR A LEAKLESS TANK

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LET US FIT YOU OUT RIGHT NOW!
Think This Over—Mr. BOAT OWNER!

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No cultivation of taste necessary—merely appreciation of the best.

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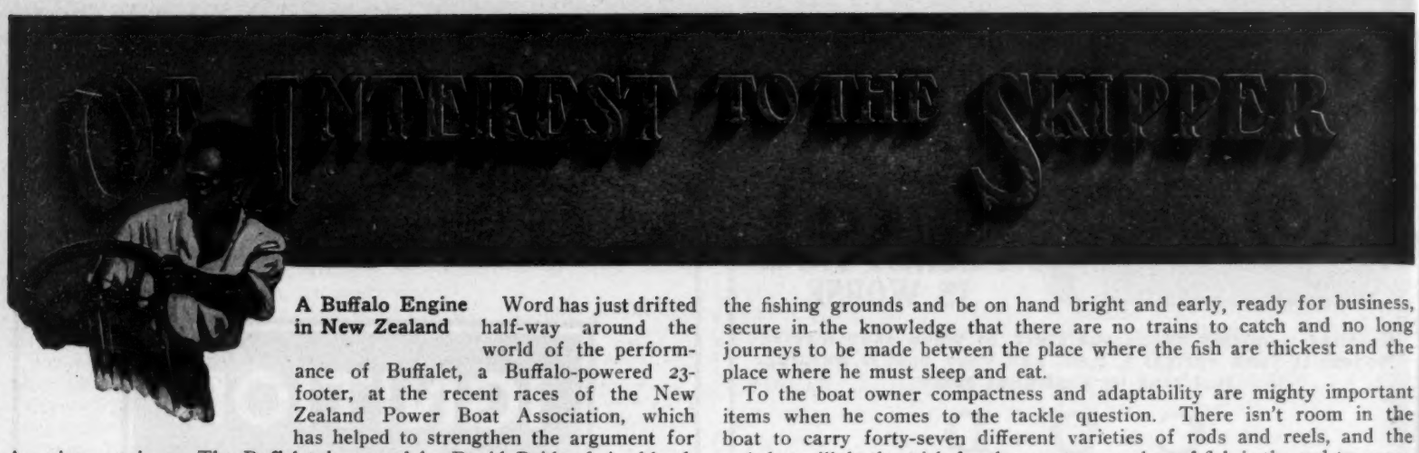


A Buffalo Engine in New Zealand Word has just drifted half-way around the world of the performance of Buffalet, a Buffalo-powered 23-footer, at the recent races of the New Zealand Power Boat Association, which has helped to strengthen the argument for American engines. The Buffalet is owned by David Reid, of Auckland, N. Z. She is 23 feet long with 5 feet 6 inches beam, and is equipped with a 4-horsepower Buffalo engine, turning a wheel 17 by 22½ inches at 500 revolutions per minute. In her first race in the under-seven-knot class held by the association last November she finished first and made the fastest time, though in competition with boats of considerably higher rated horsepower. In the second race, January 28, she again finished first, and made the fastest time despite the fact that she was the lowest powered boat in the race. In the third race, January 30, she made fastest time, but owing to a heavy handicap she could not catch the limit boats and finished third, although she came within 19 seconds of breaking her class record.

Removing Old Paint and Varnish One of the meanest parts of getting a boat in commission is the task of removing the old paint and varnish. With a scraper it is hard, back-breaking work, and with a paint burner in anything but skillful hands the chances are that any amount of damage may be done.

Buffalet, a little boat that is "doing things" in New Zealand.

Nine-tenths of the work and experience that has heretofore been necessary can be eliminated by the use of the right kind of paint and varnish remover. We say the right kind advisedly, because from time to time there have been placed on the market removers which were far from satisfactory, and which not only injured the hands of the persons applying them but raised and discolored the grain of the wood. It is due to the use of removers compounded on wrong principles that a prejudice exists in the minds of some people against removers in general. To meet all the objections which have heretofore been raised against removing compounds, the Chadeloid Chemical Company, of 100 William Street, New York City, has brought out a paint and varnish remover which is absolutely non-injurious to the finest veneers or fabrics, which will not raise the grain or discolor the wood, and which, being neutral, may be used without injury to the hands. These removers actually dissolve paint, varnish, shellac, wax, enamel or other finishes on wood, glass, cloth or metals. They are free from disagreeable odors, will not change the color of any wood or raise the grain, will not soften glue nor affect subsequent coats of finish. They do not evaporate quickly, and are always ready for use. Other directions for the use of their neutral paint and varnish remover, and information as to where it may be obtained, will be mailed to readers of YACHTING by the Chadeloid Chemical Company, of 100 William Street, New York City.

The Best Fishing in the Country The man who owns a boat has better opportunities to enjoy really good fishing than any other class of outdoor lover. The out-of-the-way places where both fresh and salt water game fish are most abundant are easily accessible to the owner of a sailing or motor craft. And, moreover, the skipper can anchor practically right over the fishing grounds and be on hand bright and early, ready for business, secure in the knowledge that there are no trains to catch and no long journeys to be made between the place where the fish are thickest and the place where he must sleep and eat.

To the boat owner compactness and adaptability are mighty important items when he comes to the tackle question. There isn't room in the boat to carry forty-seven different varieties of rods and reels, and the rod that will do the trick for the greatest number of fish is the rod to carry, while the reel that runs freely enough to be a good caster, and yet has the sturdiness to use for heavy fish, will successfully take the place of quite a battery of special purpose reels.

That's why we suggest that the readers of YACHTING write to the Redifor Rod & Reel Company, of Warren, Ohio, and ask them for full details regarding their cruiser's combination rod, which comprises a single-stick bait casting rod 52 inches long and an 8½-inch reversible handle and a fly butt and two tips each of the same length, making a 9-foot fly rod with only one ferrule. All four pieces go in one metal-covered case, which has a pocket for the handle, and with it a yachtsman is ready for any kind of fishing he may meet.

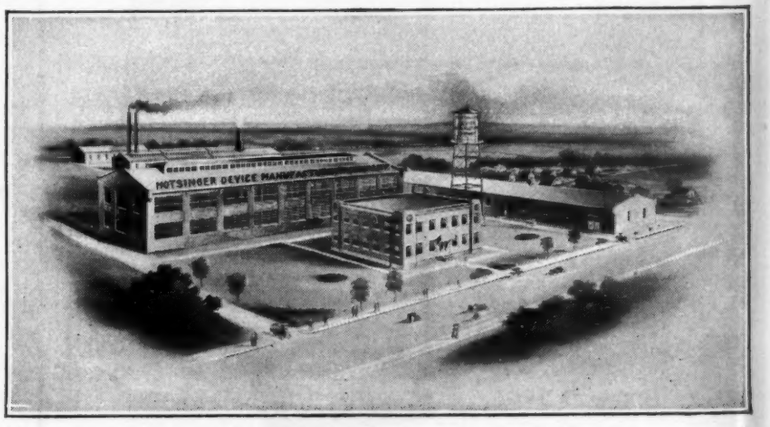
The Redifor Rod & Reel Company illustrate and describe a line of rods, reels and baits that save room in the locker and will actually catch the fish. This company is not strictly in competition with other tackle manufacturers, because they make several patented items of useful tackle that one wants in addition to the regular tackle made by others, and which they alone can furnish.

Scripps Motors in Foreign Fields In a recent letter to the Scripps Motor Company, of Detroit, Mich., their Finland agent writes as follows:

"There will be a big regatta in Helsingfors in the summer, and there will be entered five new 35-37-foot boats with 18-30 horsepower, one new 40-footer with 25-30 horsepower, and two or three smaller ones, all with Scripps engines. These eight or nine boats will tell a tale. Some of them will also travel to Stockholm."

From this it will appear that Scripps motors are very popular in foreign countries; in fact, we understand that a very large percentage of the motors manufactured each year by the Scripps Company are for export trade. It can be truthfully said that these motors will be found in every quarter of the globe, especially in Finland, Russia, Germany, South America, Australia, New Zealand and the Philippine Islands. In Russia, perhaps, they have scored one of their greatest victories, capturing the silver medal at the late St. Petersburg Exposition in competition with thirty-seven of the world's greatest manufacturers of marine engines.

Foreign buyers have the reputation of being rather skeptical and wary of making many purchases until they are fully satisfied as to the quality of the goods they are buying, and in view of this fact it can hardly be denied that the Scripps Company have just cause for their enthusiasm about their product.



The new Motsinger Device Mfg. Co. factory at Lafayette, Ind.

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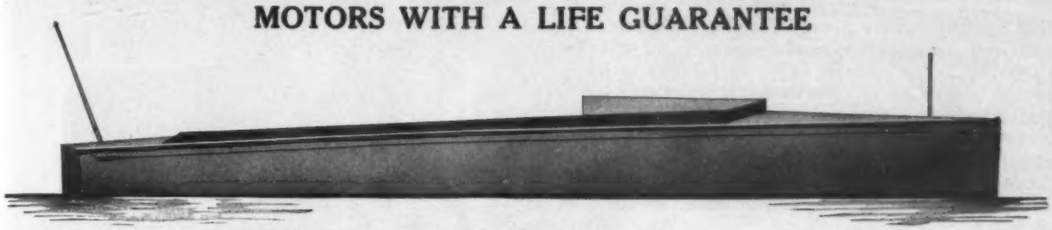
CANOE CONSTRUCTION ON SPEED LINES
MOTORS WITH A LIFE GUARANTEE



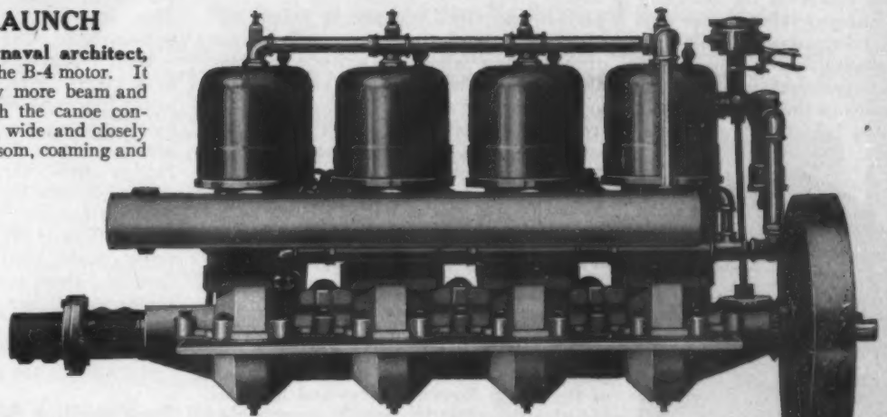
$550 { Equipped with Waterman B-2 motor. 2 cylinders, 10 - 12 horse power.

$750 { Equipped with Waterman B-4 motor. 4 cylinders, 20 - 24 horse power.

OUR NEW MODEL II CANOE LAUNCH

This new boat is designed by the well-known naval architect, Mr. Arthur P. Homer, and is particularly adapted for the B-4 motor. It is 20 ft. in length, the same as Model I, but has slightly more beam and carrying lines. There are also other differences, although the canoe construction is adhered to. Frames—selected Maine spruce, wide and closely set. Planking—Maine cedar. Stem—oak. Decks, transom, coaming and trimmings—mahogany.

This boat carries six easily, and is used as a racing yacht tender, a runabout, or a pleasure boat for general use. It is designed for use on the Atlantic Coast, as well as for smooth water work, and is a wonderfully dry sea boat.



MODEL B-4

Copper jackets; aluminum crankcase and exhaust manifold. 20-24 H. P. Weight, 248 pounds. Write for catalog.

WATERMAN MARINE MOTOR CO., 1541 Fort St., W., Detroit, Mich.

In Every Field

there is an article that stands head and shoulders above its fellows.

In the Ignition Field it is the

SPLITDORF MAGNETO

Every motorboatman who uses a SPLITDORF is enthusiastic over it.

Because he has found by experience that he can depend on it to give him Perfect Ignition and Satisfactory Service right through the season.

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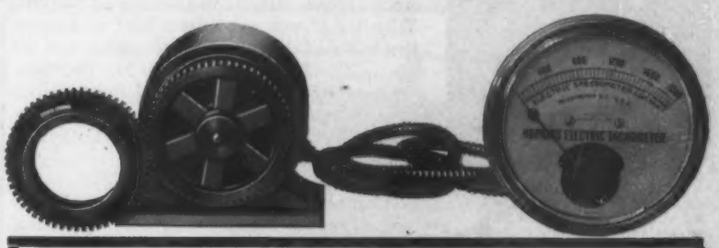


What is Your Engine Speed?

Put a Hopkins Electric Tachometer in your boat and know the **exact** speed of your engine. This unique device consists of a magneto, gear driven from propeller shaft, and an indicator mounted in engine room, cabin, on the bridge, or wherever wanted. Illustration shows a complete

HOPKINS ELECTRIC TACHOMETER

"No Flexible Shaft"

Magneto generates current in direct proportion to its speed; current is carried by brass protected twin-conductor electric cable to indicator. Any number of indicators can be wired to same magneto.

Instrument indicates accurately in any weather or temperature. Reads absolutely steady. Entire outfit is noiseless, trouble-proof, and beautifully finished in polished brass.

Used by U. S. Navy

Price **$75**

Send for Descriptive Booklet

ELECTRIC SPEEDOMETER CO., Washington, D. C.

New York Office, 1999 Broadway

A Booklet Worth Writing For The Motsinger Device Manufacturing Company have just moved into their splendid new plant at 76 Courtland Street, Lafayette, Ind., where their capacity will be considerably increased and the work carried on under the most favorable conditions. The illustration herewith shows the new factory and offices and gives some slight idea of the magnitude of the concern, which for many years has confined its efforts to, and specialized in, the manufacture of generating apparatus for gas-engine ignition and electric lighting.

The Motsinger Company are offering to boat owners a very complete and effective generating plant, consisting of a small but powerful dynamo, a volt storage battery of 80 amperes capacity and a compact and reliable charging switch with high-grade voltmeter connected to it. Their outfit will furnish ignition for a multi-cylinder engine—either make-and-break or jump spark—as well as give ample current to run the sailing and cabin lights of a 40-foot cruiser. The detail cut herewith shows the very simple and effective manner in which the charging switchboard and voltmeter are arranged to allow the skipper to control the charging and know at any time just what the generator is doing.

The generator, by the way, is perfectly governed and may be relied upon to take care of itself—no small satisfaction to a busy single-handed navigator. To those readers of YACHTING who will write for it the manufacturers will mail a handsomely illustrated booklet, showing all details of the outfit, telling how to handle it and also quoting a price on the entire layout that will make the recipient wonder why he didn't install the outfit long ago. Address the Motsinger Device Manufacturing Company, 76 Courtland Street, Lafayette, Ind.

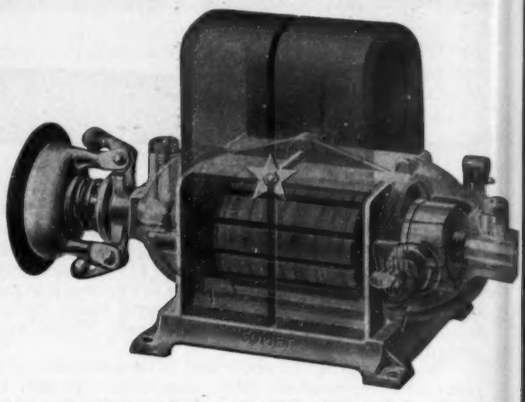
Inside wiring of charging switchboard and voltmeter made by the Motsinger Devices Co., which allows control of the charging.

A Catalogue Worth Having The Fay & Bowen Engine Company, of Geneva, N. Y., have recently completed and are now distributing their new catalogue for 1911. This is a mighty interesting and instructive booklet of some fifty pages, and not only contains a description of the Fay & Bowen engines and launches, but also describes in detail the mechanism of the Fay & Bowen engines, with cuts of the various parts. It is profusely illustrated with cuts of their motors and of the various stock boats which this company builds. Whether or not you own a boat at present you will find this booklet interesting, and we advise all of our readers who are the owners, or prospective owners, of motor boats to send for it. It may be had free by writing to the Fay & Bowen Engine Company, 102 Lake Street, Geneva, N. Y.

A Complete Ignition and Lighting Plant The new Comet magneto, the latest product of the Henricks Novelty Company, of Indianapolis, Ind., is something for which the boat owner has been looking for a long time. Its diminutive size (9 inches by 4 inches by 5½ inches) allows of its being installed in very little space. It weighs but 10 pounds, and will furnish continually the same amperage and at the same voltage as a perfectly new set of six dry cells, but with the advantage that there will be no falling off in efficiency. The Comet represents the climax of fifteen years' experimenting and building of magnetos, and for compactness and neatness of design it is all that can be desired. It is furnished with automatic governor and gives a uniform spark at all times, and may be used for either make-and-break or jump-spark systems, and in addition to taking care of the ignition of the engine will run four two-candlepower, 6-volt sailing lamps and two trouble lamps simultaneously. Being direct current and having a reliable governor, there is no flickering of the lights.

The Comet is dust proof, and the frame, which includes the base, front-end bearing magnet and pole piece support, is patented, which allows housing the magneto in the small area given above. The pole pieces are machined by special milling cutters to within one ten-thousandths of an inch, which accounts for the electrical efficiency. The brush holders can be removed without wrench or screwdriver, and the insulation is so strong as to make it practically impossible to break it down. The magneto is furnished with patented slip end bearings, which allows same to be replaced without removing any parts except the armature. The ease of renewal and the fact that new bushings cost only a few cents mean much to the boat owner. With the Comet it is possible to start the engine without the use of batteries, and every boat owner desiring not only a splendid little ignition equipment but electric light for his boat will do well to send to the Henricks Novelty Company, 324 West Georgia Street, Indianapolis, Ind., for illustrated description of the Comet.

A Sterling Cruiser The yacht Lucille, a photograph of which is shown here, and owned by J. F. Waggoner, manager of the De Soto Oil Company; W. E. Gage and W. B. McLean, of Memphis, Tenn., is one of the finest yachts between St. Louis and New Orleans. This boat is 50½ feet long by 11 feet 4 inches beam and 32 inches draft, and is fitted with two 25-40-H. P., model B Sterling engines, fitted for semi-heavy-duty work. This boat uses twin screws.



The new Comet magneto made by the Henricks Novelty Co.

Mr. Waggoner, in a recent letter to the Sterling Engine Company, expressing his satisfaction with the engines, closes his letter as follows:

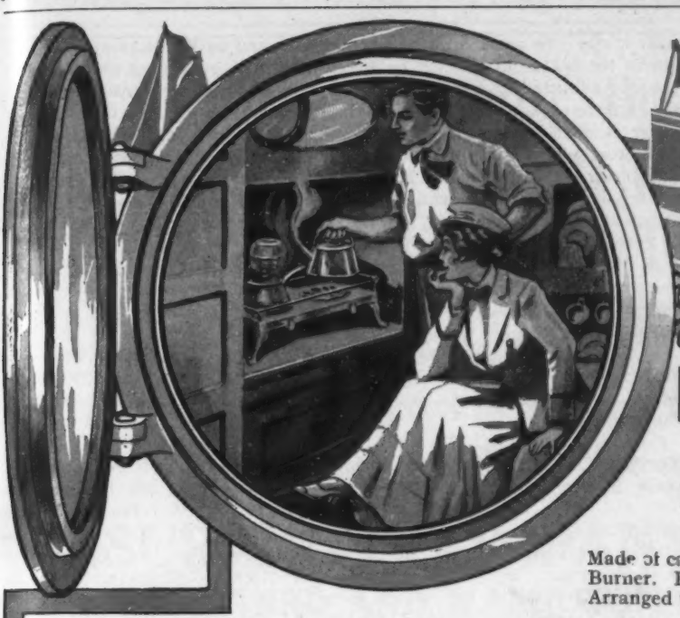
"Our boat is the pride of the local fleet, and there is not a cruiser between St. Louis and New Orleans that compares with her. Her two engines run like an Elgin 21-jewel watch, and we do not believe that we could have bought better engines at twice the price. I congratulate you on the victories the Sterlings won at Palm Beach—you know class will tell." High tribute from a satisfied Sterling owner.

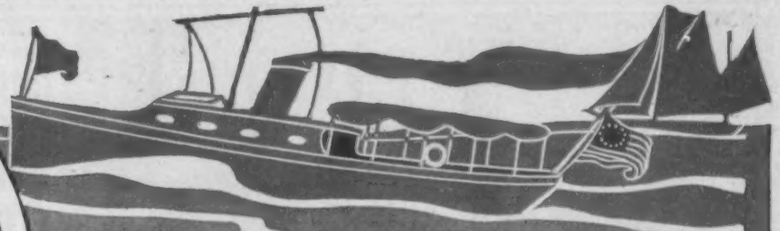
To Visit U. & H. Magneto Factory Mr. Jack L. Straub, secretary of the J. S. Bretz Company, of New York, steamed on the Kaiser Wilhelm der Grosse last Tuesday on his annual trip abroad to visit the plants which produce the goods his company markets here. His first and longest stop will be at the F. & S. ball-bearing plant of Fichtel & Sachs, at Schweinfurt, Germany, and the Fries & Hopflinger ball-making shops in the same town; after that he will go to Durlach, also in Germany, to visit the electrical laboratories of Messrs. Unterberg & Helmle, the producers of the U. & H. Master Magneto. On his way back he will stop in London, England, to visit the Bowden Wire Mechanism Co.

Mr. Straub's health has not recently been of the most robust character, but his business friends and social intimates trust that his trip abroad will restore him to good health again.

Protect Yourself Against Loss There are many disasters that are unavoidable, and but one way to protect yourself from a heavy loss. It is insurance, and every motor boat and yacht owner should have sound protection against fire and marine perils. The Insurance Company of North America, the oldest American stock insurance company which issues this kind of insurance, can give you a most liberal form of policy at very reasonable rates. They are well-known throughout the country, and we recommend our readers to insure with them, as they have made a specialty of motor boat and yacht insurance, and their policy is most liberal. Our advice is, if you are going to insure, see that you do so with a reliable company. For good, all-around treatment you could not do better than be with the Insurance Company of North America.

Motor cruiser Lucille, used on Lower Mississippi. Fitted with two 25-40 H. P. Model B Sterling engines.





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Specially Adapted for Yachts and Sailing Craft

MAINTAINS A UNIFORM HEAT REGARDLESS OF VIBRATION OR UNSTEADINESS OF BOAT

Made of cast iron, galvanized, absolutely rust-proof, with Brass Burner. Has galvanized railing to prevent dishes from sliding. Arranged to securely fasten to table or shelf.

No. 111. "Pyro" One-Burner Marine Stove. Over all dimensions, 14x16 in. Height, 14½ in. Plate dimensions, 10½x10 in. Weight, about 12 lbs.

No. 112. "Pyro" Two-Burner Marine Stove. Over all dimensions, 12½x24½ in. Height, 14 in. Plate dimensions, 11x20½ in. Weight, about 21 lbs.

No. 113. "Pyro" Three-Burner Marine Stove. Over all dimensions, 16x30 in. Height, 16 in. Plate dimensions, 11¼x31¼ in. Weight, about 27 lbs.

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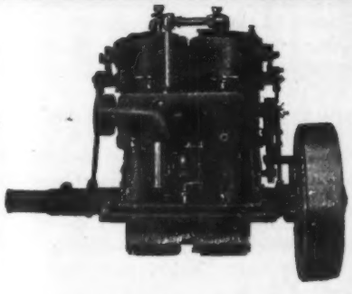
SMOKELESS ***Use "PYRO" DENATURED ALCOHOL*** ODORLESS

For full information and illustrated booklets, address

THE ALCOHOL UTILITIES COMPANY, 40 East 21st Street, New York

Our 1911 KNOX is the Best Motor we have ever produced



—certainly worthy of your investigation, considering they have been in successful operation for over twelve years.

With our model "D" Carburetor they will operate successfully on Gasolene, Kerosene, Distillate or Alcohol. Sizes 3 to 40 H. P., two and four cycle. Make and Break or Jump Spark ignition.

The Proper MOTOR for the Commercial Boat or Cruising Launch

SEND FOR OUR 1911 CATALOGUE, NOW READY

BOATS—

Our 1911 Famous **Knox YAWL Launch** is the only Launch that meets *all* requirements and sold at reasonable prices. Sizes 19' to 30'.

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SHIPMATE RANGES

8 SIZES 11 STYLES

The yachts that flit from port to port dispense a most generous hospitality, and invitations to festivities on board are eagerly welcomed.

The host can entertain right royally without any anxiety if he has a good steward and a Shipmate range in the galley.

THE STAMFORD FOUNDRY COMPANY

Established 1830. STAMFORD, CONN.

A new use for a Gray engine.

Keep the Brass Work Bright with Little Effort Every owner of a motor boat or yacht takes a pride in keeping his brass work bright; and to the man who does his own work the polish that will accomplish this result with the least expenditure of elbow grease is something that is highly appreciated.

Last summer the Motor Boat Editor of this magazine, having occasion to remove a particular bad case of tarnish from the brass work of his launch, got hold of some Brilliant polish, and instead of the usual tiresome process, accompanied by a sweat bath, which he anticipated, he was surprised to find how quickly and easily his bright work took on a polish that was the envy of the entire club fleet. Not only this, but the polish held for a long time, and subsequent polishes required no more than a light application of Brilliant and a quick rub to keep it up to standard.

Another advantage possessed by Brilliant is that it will not stain or discolor the woodwork or varnish wherever it may happen to come in contact with it, such as in deck cleats, etc. This polish can be purchased from nearly all dealers in marine supplies, and may be had in various sized tins from the smallest size up to gallon cans. If your dealer does not carry it write to the F. M. Trafton Company, 176 Federal Street, Boston, Mass., and they will supply you and tell you where it may be had in your vicinity.

Using a Gray in Winter Time The balmy days of spring are now at hand and the motor boat enthusiast has begun to think about the summer sport. Boats are being overhauled, repainted and everything made ready for the season's enjoyment. Few of these motor boat enthusiasts realize that there is a lot of real pleasure that may be derived from the use of a gasolene engine right into the coldest weather, when the thermometer is sticking pretty close around the zero mark.

We publish herewith a photograph of an outfit owned by Mr. George Oakes, of Brattleboro, Vt., which, although it does not look very much like spring time, shows how a whole lot of pleasure can be had out of a gasolene engine during the cold weather.

This boat was built by Mr. C. H. Oakes, father of the owner. It is equipped with a 4-horsepower, single-cylinder Gray motor, and is a very speedy affair. With four persons aboard it has made a speed of 24 miles an hour, and with only two persons it has done a trifle better than 30 miles an hour. Next winter Mr. Oakes expects to use a 7-horsepower model T Gray engine for this boat, and looks for much higher speed. The Gray Motor Company's new catalogue is now out and ready for distribution. It is a handsome and interesting booklet, and may be had free of charge by writing the Gray Motor Company, 540 Woodward Avenue, Detroit.

How to Get More Speed from Your Boat Every time we get into a tight corner with our boat, where it becomes necessary to slow down and yet keep steerage way, we invariably wish that we had some means of just keeping the motor turning over without danger of stalling; and every time the "other fellow" manages to slip past us we wish that we could get another hundred revolutions out of our propeller and keep to the front.

Well, that is just what the new carburetor built by the Marvel Carburetor Company, of Indianapolis, will allow us to accomplish. The Marvel has a jacket taking hot gas from the exhaust, and this jacket is throttled and so arranged that on low speeds and on starting up when one needs the heat most, the heat is right there on the job—decreasing as engine throttle is opened. Not only is it possible with the Marvel to allow the engine to run at a speed at which it always stalled before, but with it one can practically add 100 revolutions to his engine. The trick lies in the ingenious method by which a throttle governing the amount of hot gas admitted to heating jacket is connected to the throttle proper of the carburetor; and from the fact the hot gas from exhaust instead of hot water is used for warming the mixture. Exhaust gas is hot from first explosion, while water requires time to heat. Continual heating of the carburetor while keeping it at high speed is of no particular advantage; in fact, is often a detriment. Heating it at low speed (closed throttle) is an advantage and a big one, and that's where the Marvel gets the most out of even the lowest grade of gasolene.

A Marvel practically adds a low and a high gear to the engine, and, moreover, allows the use of the boat late in the season without any danger of being obliged to heave-to while the skipper applies hot towel facial massage to his vaporizing plant.

It would be a mighty good stunt for each of you skippers who reads YACHTING to write to the Marvel Carburetor Company, of 2226 Alvard Street, Indianapolis, Ind., and ask them to tell you about their thirty-day trial offer.

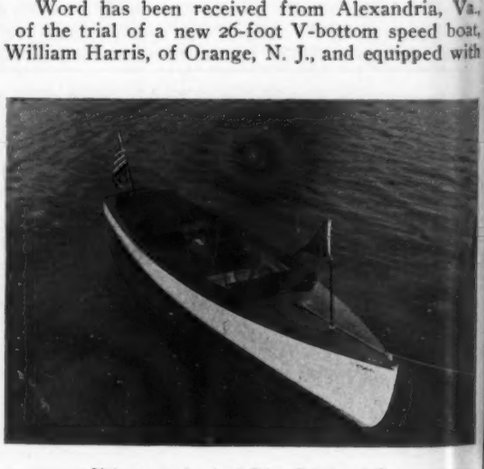
Turning Out a Complete Motor Boat An outing in a motor boat is made possible for many people this year by the low prices at which good boats are offered. One of the most attractive of the less expensive models exhibited at the Motor Boat Show in New York was the $275 20-footer shown by Rice Bros, Company, of East Boothbay, Me. The question was often asked there, "How can they build such a boat for so little money?" A recent visit to the boat shop of these enterprising builders enables me to answer the question—the result is made possible by conservation of energy.

The open door of the shop admits to a large storeroom, where row upon row of boats, each in its white cloth cover, awaits shipment. On the upper floor, in convenient order, are work benches, tools, planks—mahogany, pine, oak—every man's equipment at his hand when he needs it and as he needs it. From the moment the ribs of the boat, steamed to pliability, are bent over the mold, until, with shining engine and polished hull, the craft is veiled with her white cover and lowered into the company's storeroom, not an unnecessary movement is made, not a moment's time is lost. In the hours of a working day a small crew of men, by concerted and concentrated labor, construct and deliver to the purchaser a 20-foot motor boat, complete from bow to stern, sheathed in mahogany, equipped with a smoothly-working engine, and arranged to seat a party of ten persons. It is almost literally "a boat while you wait."

From the hands of the first workman, who fits the ribs, slips into position the keel, and screws on the planks, numbered and lying by his hand, the boat is turned over to a second man, who gives her his attention. Braces and gunwale being received, another somersault lands the boat in the hands of man number three, who deftly calks the seams, planes the hull, and, after another overturn, puts in the floor boards. Man after man adds his work, until the mahogany finish has had its final polish and the shell is ready for the engine.

Meanwhile, in another part of the plant the ironworkers are building the powerful little engine which is to propel our boat even in the face of wind or tide. The engine is made from the firm's own model, and in consequence it has been necessary to make in the shop special molds and dies for the turning and boring in order to obtain the utmost perfection of product with the least expenditure of labor. A new engine must work smoothly and easily without any extra adjustment. All of the work is done under the watchful eyes of the members of the firm—honest, honorable, young men who insist that in their boats "Every part shall be jest ez good ez the rest."

A 42-Mile 26-Footer Word has been received from Alexandria, Va., of the trial of a new 26-foot V-bottom speed boat, recently built for Mr. William Harris, of Orange, N. J., and equipped with two 6-cylinder Emerson engines. This 26-foot boat, over a measured mile course, attained the remarkable speed of 42 miles an hour, much faster time probably than any 26-foot boat has ever before made. The boat was run all the afternoon and given a severe test, the engines working perfectly, so that the timed mile was not merely a short spurt.



20-foot runabout of Rice Brothers' Co.

If Your Boat Should be

SUNK IN COLLISION

BURNED TO WATER'S EDGE

WRECKED ON THE ROCKS

Our policy covers against these losses and many others.
Write for sample policy.

INSURANCE COMPANY OF NORTH AMERICA
THIRD AND WALNUT STREETS, PHILADELPHIA, PA.

Capital, $4,000,000 Founded, 1792
Surplus to Policyholders, over $7,000,000

IT COSTS BUT A FEW CENTS A DAY AND MAY BE WORTH HUNDREDS OF DOLLARS TO YOU

TROUBLE WITH THE SPARK

Cylinder oil should never be used on commutators or magnetos. All cylinder oils—without exception—are mineral oils. And all mineral oils always have and always will gum, harden, dry out, collect dirt and eventually clog delicate commutator bearings.

3-IN-ONE

is the oil, commutator and magneto manufacturers recommend. It simply can't gum, harden, cake, dry out or collect dirt. It wont heat up, smoke or burn even though you speed the motor to 5,000 revolutions per minute.

3-In-One is the best preparation on land or water for cleaning and polishing all nickeled parts and metal surfaces and every veneered or varnished surface. It positively will prevent rust or tarnish or verdigris forming on any metal, anywhere, under any condition.

FREE Write for generous sample bottle and our free dictionary today. Sold by all supply houses and good stores. 8 oz. 50c; 3 oz. 25c; trial size 10c

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FOR THE CRUISE
A fine result for many dishes is assured by using
Borden's Evaporated Milk PEERLESS BRAND
Will keep perfectly for a long cruise, and very greatly add to the pleasure of the whole party. Don't go on a trip without it.
BORDEN'S CONDENSED MILK CO.
"Leaders of Quality"
Est. 1857

The Dawn in Motor

COMBINATIONS of manufacturing enterprises are of two kinds: first:—those formed to throttle competition, boost prices, control the output of products, and thus create enormous private fortunes; and second—the spontaneous getting together of manufacturers of the same general product to enable them to conduct their business better and more economically; to increase their purchasing power; to reduce their executive and overhead expenses and selling costs; to concentrate the brains and ability of each upon the problem of the whole, and thereby give to the buying public a better and more standardized product at less cost.

The National Boat and Engine Company is of the latter kind. It is the leader in a great and rapidly growing American industry. It was created to meet the enormously increased demand for motor boats, which, as a recreation and sport, is at present commanding greater public favor than any other means of locomotion for pleasure.

The strength of a concern is measured by the men in it. The officers of this Company, active, practical men who have made the motor boat industry what it is to-day and, by their consolidation, open the way to greater development than has ever before been possible, are as follows:

Mr. W. J. Reynolds, President; formerly President of the Racine Boat Manufacturing Company.

Mr. J. M. Truscott, Vice-President; formerly President of the Truscott Boat Manufacturing Company.

Mr. C. A. Williams, Secretary; Secretary of the Charles H. Fuller Company, Publicity Expert.

Hon. John Q. Ross, Treasurer; Lieutenant-Governor of the State of Michigan.

The Board of Directors is composed of these gentlemen and the officers of the various plants included in the National Boat and Engine Company.

The National Sales Organization

A typical example of what this Company is doing to make it possible for everyone to own a motor boat and partake of the joys that life in the open brings, is seen in the establishment of the enormous selling agencies in all parts of the country where full lines of standardized boats can be purchased at new National prices. The great stores and show-rooms at New York and Chicago, with branches in all large cities, and agents wherever motor boats are used, bring to your door the pleasures and benefits of this wonderfully healthful sport.

# of a New Era Boat Building

An Old Business Made New

THERE are ten great companies included in the National Company, covering a combined floor space of over three hundred thousand square feet, and having a capacity of five thousand boats of all kinds per year. But do not think because this new idea in motor boat building and selling is now applied to the industry, that the companies which compose it are new also. They represent all that is best, solid, sure and experienced in motor boat building, and the individual plants and companies are and always have been the leaders in the motor boat world in their respective lines. Their boats have been known as the finest products of boat building experience, and NOW you can get the output of these great plants and builders, standardized and perfected to a higher degree than ever before.

We Cover the Entire Field of Motor Boat Building

We offer you anything and everything in the way of motor craft and small boats that can be desired—all built to one high standard, and sold under one broad guarantee. The Government has recognized the economy of our method of construction, and our superior facilities, and we are executing at the present time many Government contracts for light ships, tugs, light-house tenders, life boats, etc.

We Offer Complete Service

We exhibit at our various show-rooms for inspection, trial and prompt delivery, a complete line of cruisers, launches, row-boats, dingeys, canoes, engines, and accessories. Here the man of moderate means can find a boat as low in price as $20, while the man of wealth can select a palatial yacht or high-powered speed boat.

National Boat & Engine Company

1210-1212 Michigan Avenue, Chicago

Factories Are In:

West Mystic, Conn.	Michigan City, Ind.		Shell Lake, Wis.
Muskegon, Mich.	St. Joseph, Mich.		Lake Geneva, Wis.
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Branch Stores and Agencies In:

New York	Rochester	Philadelphia	Jacksonville, Fla.
New Orleans	Chicago	Washington, D.C.	Bridgeport, Conn.
Boston	San Francisco	Buffalo	Detroit
St. Louis	Baltimore	Seattle, Wash.	Pittsburg

NATIONAL BOAT & ENGINE CO., 1210-1212 Michigan Ave., Chicago, Ill.

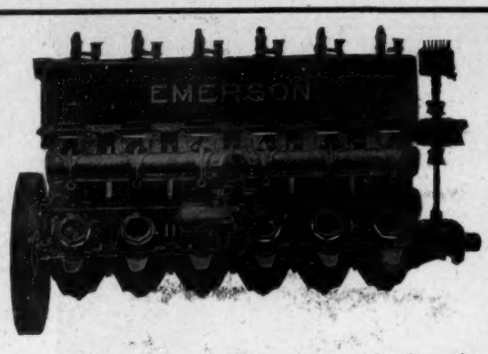
Gentlemen: Send me please, without obligation on my part, detailed information concerning a .....

ft. (State size and kind of boat interested in) ..... waters.

for service in ..... (State whether for inland lakes, gulf, sound, river, etc.)

Name ..... Address .....

City ..... State .....



Judge a Thing by What it Does

100-125 H. P. Weight 300 lbs. Thirty-six Starts in one season and Thirty-six Firsts, defeating America's best known boats. This proves whether they will stand up and what they *will* do.

We are equipping the largest lot of boats above thirty miles per hour ever produced by one firm. Over Five Hundred flights in a Heavier-than-Air Machine without a single accident. The only engine that has flown with four men, and the only engine with sufficient power to alight in the snow and water and fly out again. This is the record of Antony Jannus in a Rex Smith Aeroplane at Washington, D. C., eclipsing all flying records in this or any other country.

WRITE FOR PARTICULARS

The Emerson Engine Co., Inc., ALEXANDRIA, VIRGINIA, U. S. A.

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THE COAST LINE TO MACKINAC

DETROIT CLEVELAND BUFFALO NIAGARA FALLS

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Where will you spend your summer vacation? Why not enjoy the charms of our Inland Seas, the most pleasant and economical outing in America?

Daily service is operated between Detroit and Cleveland, Detroit and Buffalo; four trips weekly between Toledo, Detroit, Mackinac Island and way ports; three trips weekly between Toledo, Cleveland and Put-in-Bay.

A Cleveland to Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every other trip.—**Special Day Trips Between Detroit and Cleveland, During July and August.—Railroad Tickets Available on Steamers.**

Send 2 cent stamp for Illustrated Pamphlet and Great Lakes Map.

Address: L. G. Lewis, G. P. A., Detroit, Mich.
Philip H. McMillan, Pres. A. A. Schantz, Gen'l Mgr
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GRAFLEX CAMERA
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Because it is the fastest camera and lens equipment made; because you can *see* what you are going to get on your plate up to the moment of exposure; and because it is always ready for instant work. Our descriptive catalogue is yours for the asking.

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Specialists in Things Photographic
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The Prices of SOPER 2-cycle Gasoline Engines are reasonable, but you can find nothing better at any price for Automobile, Marine, Portable, Stationary and Hoisting purposes. 3 to 30 H. P. 1 to 6 cylinders. Designers and Builders of Power Boats—all styles.

Bucksport Launch and Engine Works **BUCKSPORT, ME.**

$2,000.00 in Prizes For the Big Game Fish

FIELD AND STREAM

"America's Magazine for Sportsmen," is Offering 203 Prizes for the Biggest Fresh and Salt Water Game Fish Caught During 1911

This $2,000.00 will be divided into 203 monthly prizes for the biggest fish caught each month and grand prizes for the entire season in each class. Prizes include $60 silver cups, silver medals, high class rods and reels, guns and sportsman's equipment.

List of prizes and conditions of contest published each month in FIELD AND STREAM. As you will want to read the accounts each month of How, When, Where and with what tackle these big fish were killed, we are going to make you a special introductory offer of a three months' trial subscription to FIELD AND STREAM, together with the 1911 Angler's Guide, the best book on fishing published, telling how, when and where to fish, including the latest Game and Fish Laws for 1911 and a five-foot split bamboo bait casting rod, } **All for $1.00**

Send in your order today and learn all about this great contest.

FIELD AND STREAM PUBLISHING CO., 32 East 21st Street, New York City

The "Lady Maud," Schooner Yacht

(Continued from page 523.)

height inside. All the tools which had been to top of this shelf were gone; but on dragging u the shelf, which lay jammed in the box like cork in the neck of a bottle, we found the botto full of nails of all sorts, some half as long as m arm, together with a saw, a chopper, fashioned t serve as a hammer, too, and three sailors' sheat knives.

"We shall find these things useful," said I; " let us drag the chest clear of all risk from th breakers."

We laid hold of it and hauled it up the beac then returned, and in ten minutes' time collecte the following articles: the tell-tale compass, wit a portion of the beam to which it had bee screwed; two wooden cases, presently to b opened; a small cask, very heavy; a large kettl the lid of which was gone and the spout warped three spare sails, and a mass of the yacht's plank and timbers. We saved all the wood we coul find, with the idea of building a hut for th women to lie in that night. We likewise searche the beach, down into the very fork of the ti bay in the southeast corner, where the water wa tolerably smooth, owing to the shelter of the lan and found a quantity of timber, but nothing mor to our purpose.

On opening the head of the cask, I found t my joy that it was full of salt beef, and, wha was equally gladdening, the two cases containe each of them three dozens of tins of differen kinds of preserved meats, which had been shippe for cabin use. This, you may be sure, we reck oned a noble discovery, for here was food read cooked for us to eat. Forthwith we laid hold o the cases and carried them up to the tent.

"Here are the materials for two and perhap three meals a day for nine days," I cried, ad dressing the inmates, generally, "allowing eac person a tin. Tripshore, go and fetch thos sailors' knives. We shall all feel the better for breakfast."

The man brought the knives, and we opened couple of the tins, using a piece of deck plan for a table. I divided the contents of the fir tin into eight portions, and I made the same d vision of the meat in the second tin. Had w had bread or biscuit, or anything of that kind, eat with this preserved food, the portions woul have made a fair meal. As it was each person share could be dispatched in a few bites. But would not open any more tins at that sitting. had only to consider how absolutely destitute wa this island of all sustenance fit for human being and how days and nights might pass withou bringing us any help, to understand the precious ness of the food that had been cast up by the se

The gale still blew violently over the islan and the sky resembled a vast sheet of lead, with kind of brown smoke-like scud driving alon under it, and scattering, just as smoke scatter as it went. We were close to the sea, and h the roar of the surf in our ears. Never did shi wreck create a more dismal group of huma beings than we looked as we sat peering at o another in the gloom under the sail. Nor, in m opinion, did life ever establish a sharper contra in so short a time. You are affected when a poo hungry, shabby man is pointed out to you as o who so many years ago possessed a fortune a lived in grand style. But here were we, who on a few short hours ago enjoyed all the luxuries a superbly appointed yacht, flung half naked up a desolate island, forced to squat and eat o food like savages, treasuring that poor food, a valuing it at a price which the whole of the isla made of gold would not have paid for, a already having proved that we had gauged de all the horror and wretchedness of shipwreck

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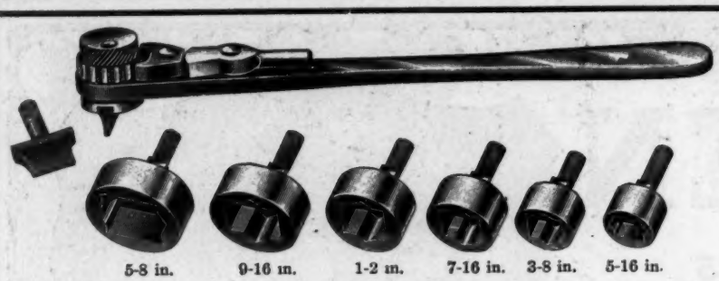

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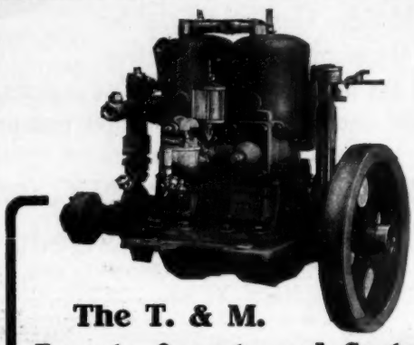

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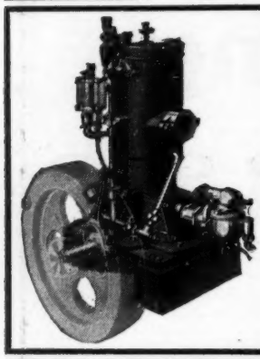

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the exultation which the discovery of a little well of rain-water had inspired in us.

I got up from the grass and looked at the sea, to find out if any more wreckage had come ashore; and then addressing Tripshore and Hunter, I said that we were well into the day, and ought to go to work at once and rig up a better habitation than the one over us, whilst we had the light. Here was plenty of wood, and we had a saw, a hammer, abundance of nails and sail-cloth. But, first, on which side of the island should we construct the hut? Here, among the trees and near the beach, where we should see all that came ashore from the wreck? or over there among that clump of trees to the lift of the bush, where we should be within three minutes' walk of the well?

Hunter was for crossing the island, Tripshore for stopping where we were. I asked Sir Mordaunt, who said he was for stopping; so that decided us. He wanted to come out and help us, but I swore I would not lift a finger if he quitted the shelter, as he was in no condition to work; and, moreover, I said there were enough of us and to spare.

So we left him with the women; and the four of us, that is, Norie, the seamen and I, went down to the beach and brought up the fragments of wreck to the trees, where we presently had a great pile of deck planking and portions of the skin of the vessel and other parts of her; for she had gone to pieces, I may say, as a house falls in. She had been ground into fragments by the great sea that had beaten her down upon the jagged, iron-hard reef. We then brought the tool-chest along, and set to work to nail the wreckage to the trees. This took us a long time, for we had but one hammer; but some of the deck planking had been thrown up in middling big pieces—that is, there would be three or four planks nailed together—and this enabled us to push forward with our job.

I was the only one of the party who had a watch, and it had stopped when I was in the water. We had no sun to guess the hour by; but I supposed it would be about 3 o'clock by the time we had fairly framed in a group of trees, forming an inclosure that might be nearly 12 feet by 10, and about 6 feet in height.

We broke off when we had got so far, and sent Hunter with the kettle to the well, and divided the contents of another tin of meat, after which we fell to work with renewed energy to roof in our strange structure with the sails. This was not an easy task, for the trees in the middle of the hut were in the way. However, we managed it by cutting the cloths so as to let the trees come into them. One sail was enough to make a roof. It was, indeed, a spare foretopsail, and by means of lanyards we triced it as taut as a drum-skin. To make the shelter more complete, we passed another sail round the hut outside as far as it would stretch. We then unbent the sail that had served us as a tent, and that by this time was thoroughly dry, and spread it over the floor of the hut. And not yet satisfied, I made Tripshore help me to cut up the remaining sail, which we nailed to the trees inside in such a manner that one part of the interior was entirely screened. This space I meant for the women to sleep in.

We had scarcely finished, and were looking about us to see what more could be done, when the interior of our little shelter grew bright, and stepping outside, I saw the sun flashing with a watery-reddish brilliance in the west. The great leaden cloud that had heavily overhung us all day was broken up into masses of dark vapor, which were solemnly journeying across the sky, and here and there among them were glimpses of misty blue. The horizon was clear, the gale had broken and was falling, but the ocean was still

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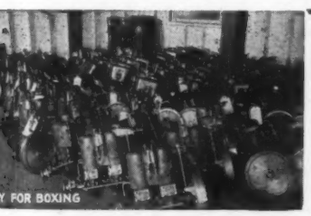

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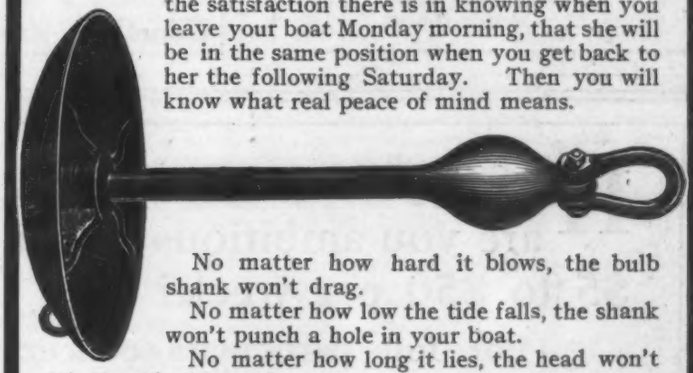

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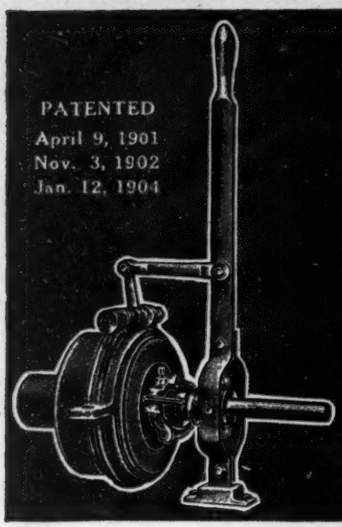

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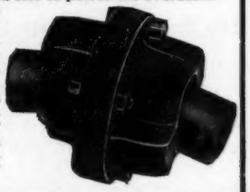

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a wild, tumultuous, leaping and rushing surface.

"There's another cask come ashore, sir," shouted Tripshore; and he and I and Hunter dashed down to the beach.

I overhauled the marks upon it, and sung out: "It's either brandy or sherry. Roll it up, boys, to the hut, and we'll test it there."

It was full, and we had a hard job to get it along. Sir Mordaunt said it was sherry; but, valuable as it was, I would have given twenty such casks for one of biscuit.

Before it fell dark I wanted to ascend the little hill and have a look around for land. "Let us all go," said I, "for one may have sharper eyes than the rest."

So we left the hut, and I asked Miss Tuke and Mrs. Stretton to join us. I also called to Norie and the seamen, and the whole company of us started for the hill, leaving Carey dozing in the hut and the dog to keep watch beside her.

We gained the top of the little hill. The windward sky was clearing fast, and the blue of it was growing pure. No more than a fresh breeze was now blowing, and I reckoned that it would all be gone by sunset. The circumference of the deep lay open to us, saving one small part blocked out by trees in the northwest. We searched the circle narrowly, but, good as my sight was, I, at all events, could perceive nothing but the water.

"How far should we be able to see from this height, sir?" inquired Hunter.

"About 14 or 15 miles in clear weather," I answered.

"Isn't that land out there?" exclaimed Mrs. Stretton, crossing to my side, and pointing to the right of the track of the sun.

I gazed and gazed. Suddenly Miss Tuke cried, "Yes! there is a little film there—a tiny blue shadow—I see it plainly."

"Right you are, Miss," said Tripshore. "There it is, Mr. Walton."

I thought I saw it, but when I shut my eyes to clear them, and looked again, it was gone. None of the rest of our party could see the tiny shadow which made those who saw it wonder, for they said it stood there plain enough. I took for granted that it was land, and asked Tripshore if his memory carried the chart sharply enough to recall what island would have land bearing in that direction from it visible, say about 20 miles. He puzzled and reflected and knit his brows, but the poor fellow could not remember. Indeed, it was not a thing to be guessed. If you look at the Bahama Islands, you will see how crowded the chart is with rocks and cays and reefs and islets similar to the one on which we had been cast. It was idle to recall Purchase's reckoning for I knew that we were much further to the west than that, and much further to the south too, I was sure. But there was no use speculating upon that shadow which Miss Tuke and the other two saw. If it were land, we should never be able to find out what land it was by guessing. Elsewhere the horizon was quite bare.

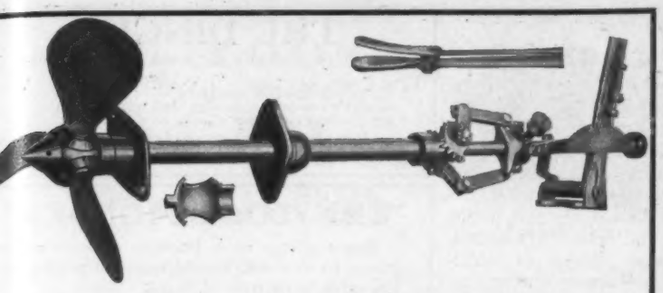
"But so much the better," said I, gazing into the east; "for if that water out yonder is clear surely there will be vessels traversing it, bound to or from Providence Channel or the Florida and North Carolina coasts to the West Indian Islands. Don't you think so, Tripshore?"

"I do, sir. Anyhow the chance is good enough to make a lookout a necessity. If we could raise a flare, something might come of it when it falls dark."

"But how are we to get a light?" I asked. "Who has any matches?"

The men felt about their pockets, but to no purpose. Sailors seldom carry lights; the galley fire is their lucifer-match. We all searched, but none of us had any matches nor the means of procuring fire.

"Something to make fire may come ashore



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The furnishings include new ropes, two anchors, 30-in. copper ventilating cowls, port air scoops, fine brass lamps, one 10-ft. $80 Mahogany Dinghy, tools, etc.

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When writing kindly mention having seen this advertisement in "Yachting"

the night," said Hunter. "There's no use despairin'."

Still it was terribly vexing to be without fire. There were many reasons why a flare would have been good for us. We could have dried our clothes; we could have cooked the salt beef in the kettle; it would have made a cheerful light, too, something to keep watch by; above all, we should never be able to guess what it would be doing for us—what passing distant vessel it might attract, that would lay to and wait for morning to run down to us, the mere dream of which would have acted like a cordial upon our spirits.

After lingering awhile on the hill, looking at the sea, and watching the red sunlight wax and wane as the clouds rolled over the setting orb, we went slowly toward the hut.

I was determined to do my best to keep up the spirits of the people, and made some of them smile by suggesting that we should take a drink of the sherry out of the kettle.

"It's too good to dip a boot into," said I. "Besides, I couldn't fancy sherry out of a boot—not even out of Mrs. Stretton's boot, small as it is."

"But you won't dip that great black kettle into the wine?" said Miss Tuke, with a laugh that made us all seem to forget our troubles for the moment.

"No; but if we could manage to bail some of it into the kettle," I answered, "we could each of us take a pull at the spout."

Here Hunter walked off to the beach, to look, as I supposed, for any articles that might have come ashore. I told Tripshore to open a couple of tins of meat, whilst Norie and I worked at the cask of wine; and whilst we were full of this business, comes back Hunter with a big shell in his hand, and gives it to me with a face of triumph.

"There's a bailer for ye, sir—the biggest I could find in this light," said he. "Mr. Tripshore, there's a box away down in the cove" (meaning the little creek at the end of the beach). "Will you come along and help to bring it up?"

"Save all that you can," said I; and away went the two men.

Having got the head of the wine cask open, I dipped the shell into the sherry and handed it to Mrs. Stretton. It held near upon a gill. It was better than drinking out of the kettle, and I admired Hunter's readiness. Pretty it was to see the women drinking the wine from the shell, that was deeper than an oyster shell, yet of that shape, thickly ribbed, and each rib defined by a red line.

I felt desperately low-spirited whilst dividing the poor repast. I kept on thinking, "What in God's name shall we do if we are not succored before our slender provisions are exhausted?" But the arrival of Tripshore and Hunter with the box took me away from these melancholy thoughts, and I went out to inspect the new acquisition. As I approached it, Tripshore sidled up to me, and whispered in my ear, "There's two dead bodies come ashore, sir. One's the cook and t'other's poor Jim Wilkinson. Better say nothen about it. Me and Tom 'll steal away presently and bury 'em."

I nodded, and began to handle the box.

"Why, Carey, is not this yours?" exclaimed Miss Tuke.

The girl looked, and said yes, it was her box.

"It is locked," said I. "Have you the key?"

She fumbled in her pocket, or rather in the hole where the pocket should have been; but the sea had torn that convenience away.

"You can break it open, sir," said the poor girl, simply. "I know what's in it."

I broke the lock with the chopper, and told her to explore the contents, as for all we knew it might contain something that should prove of great value to us. (To be Continued.)

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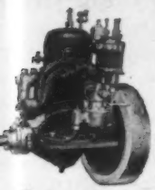

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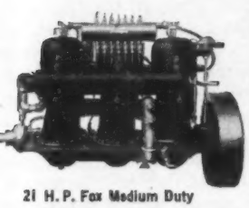

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A Short Ship on a Long Cruise

(Continued from page 512.)

of Amherst Island shut them off. The Three Brother Islands hove in sight. Beyond them the course seemed to be landlocked, and as a matter of fact it was very nearly so, for the end of Lake Ontario was at hand. Salmon Island, Snake Island, Simcoe Island, Wolf Island, Garden Island, Cedar Island, Whiskey Island, and the other 993 of the Thousand Islands of the St. Lawrence were right over the bows, and the domes and spires of the Limestone City were showing up through the tree tops. The fine grey buildings of Rockwood Asylum and the Penitentiary at Portsmouth sped merrily past on the port side, and Kingston harbor, with its grain elevators, ancient round martello towers, and the assembled L. Y. R. A. fleet at anchor off the yacht club, lay before the oncoming Blue Peter. At half-past three, six hours and a half from Picton 40 odd miles away, she passed the yacht club and rounded up, completing her outward voyage.

And then everything happened at once. She swung part way into the wind and hesitated. Lo her wire rope steering gear had parted—chafed right through—where, unknown, it had jammed between the shell and sheave of one of the blocks. And the jawrope of the main gaff parted, and the gaff jumped the mast. And although the Old Man gave her all the heavy chain in the ship and ben on a good line to the end of the cable, her anchor would not hold her. It looked bad for a moment but he had taken the precaution to pass to leeward of the fleet before anchoring; and while she dragged, she dragged slowly, and had a good clear stretch astern of her. So he got the jib rolled up and the mainsail stowed, and rigged the steering gear afresh, and then set the mizzen and jib and hove up. Kingston harbor is poor holding ground, anyway, with a rocky bottom; but the anchor trouble was just as suspected. The stock had unshipped and was doing no work. Under the two pieces of canvas the Blue Peter stood in for one of the slips, and made fast there—an example followed by most of the fleet. The dry dock, which had not been pumped out, furnished moorings for eight yachts at one time.

(To be Continued.)

Models and the Making of Miniature Craft

(Continued from page 499.)

at the illustrations shown here of the battleship St. Louis. In one picture it is self-evident that the craft is nothing but a miniature. The upright upon which it rests are plainly seen. Although it is hard to believe, the other cut is another copy of the same picture, with the underbody hidden by a painted ocean and with a little smoke added to give the picture life. The truth of the statement is plainly seen when the shadows on both craft are compared. Were the second illustration shown alone no one would doubt for a moment but that it was a photograph of a warship taken at sea.

Of even more interest than the model of the St. Louis is a collection of half models that were made for the government to exhibit at the Jamestown Fair. These miniature men-of-war show in chronological order the development of the American navy, class by class, from the illustrious Bon Homme Richard to the scout-cruiser Salem. The group not only was exhibited at Jamestown but at other national fairs throughout the country. In fact, the government makes a point of exhibiting its models whenever possible, as the Navy Department rightly believes that millions of people who never have the opportunity of seeing a warship may learn something about the floating strength of the country from the wonderful miniatures.

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collection in Washington, but at the Naval Academy in Annapolis there are many beautiful models of men-of-war. The miniatures are put to a very practical use by the Academy authorities. By the use of models the middies learn a great deal about a battleship without actually treading a deck. One of the gems of the collection is a model of the battleship Illinois, shown in a miniature drydock. This model is used to teach the cadets not only something about a man-of-war but also to give them some idea of a drydock.

The Smithsonian Institute also has an interesting collection of models of historic craft. Among the number is a miniature of Phœnix's first steamboat. This craft was built when Robert Fulton was experimenting on the Hudson River. The model maker always is busy with some sort of marine monstrosity. These models may be hydroplanes, high-speed boats, battleships, merchant vessels and craft with wonderful screws, propellers or other unique ideas.

It is the yachtsman, however, who is the real lover of the miniature craft. Pictures may please, but a model is a thing of beauty that sings a most bewitching song. When the new love takes the place of the old a peep at the model brings back recollections of spirited races and happy cruises in the "good, old summer time." That is why so many yachtsmen own models of their boats. Probably the most interesting collection is the one owned by former Commodore H. A. Morss, of Boston. Six miniatures are in the group and they were all built by the H. E. Boucher Manufacturing Company. The boats represented are: Vim, winner of the Roosevelt Cup in the international *sonderklass* races against Germany; Aspenest, Brigand, Cossack, Vision and the schooner Dervish. The last craft won two deep-sea races to Bermuda several years ago. These are full models, every detail of rigging and deck fittings being shown.

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Fourth Annual Regatta of the M. V. P. B. A.

(Continued from page 556.)

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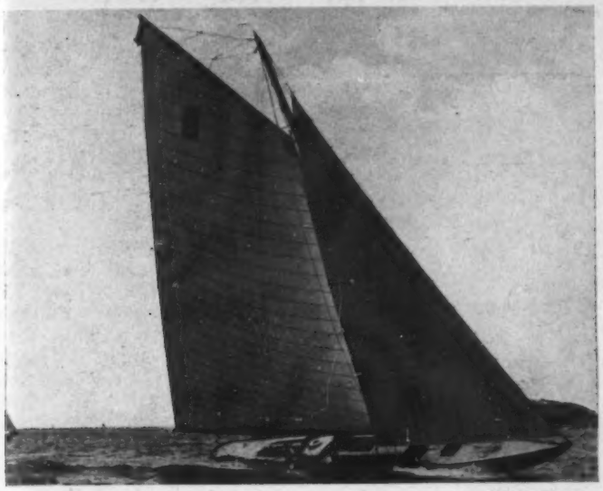

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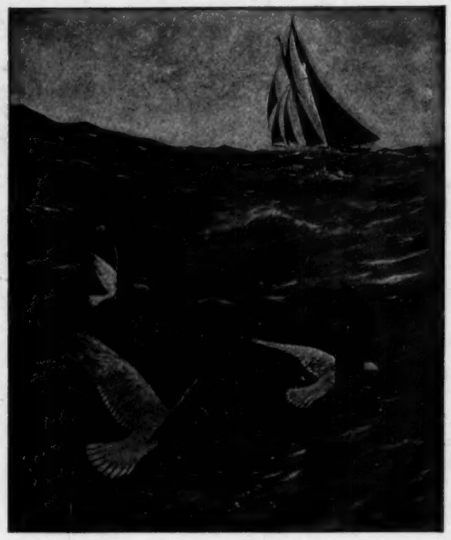

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Fireworks for the Yacht or Club

It has long been the custom for all yacht and motor boat clubs to celebrate the anniversary of the signing of the Declaration of Independence by a more or less elaborate fireworks display, and nothing makes a more fitting ending to the National holiday or to any regatta or fête day than this. Usually the house committee will buy a various assortment of fireworks which they endeavor to set off themselves, in a highly unprofessional manner, and in a way that is apt to make a rushing business for their tailors the following day in replacing burned clothes, etc. Not only is this unnecessary, but a more satisfactory exhibition can be procured for the same money by dealing with the United Fireworks Company in procuring one of their exhibition fireworks displays. This company will furnish its own pyrotechnists to erect and fire the display, thus relieving the club of all danger or worry in connection with the affair.

The United Fireworks Company not only make a specialty of these displays, but also of aerial bombshell work and rockets for signaling, some of the shells having as many as eight detonations. The company also manufactures magnesium, red fire and coston signals, and handles everything in the decorating line, such as flags, banners, Japanese lanterns, etc. Those who are only familiar with the older forms of rockets and red fire will be surprised to know the number of novelties that are now manufactured for fireworks display.

Any club planning a fireworks display for any of their events during the season would find it very much to their advantage to write to the United Fireworks Company of Trenton, N. J., for estimates and full particulars as to their displays, the method of handling and the cost.

New York to Albany and Return Motor Boat Race

The third annual motor boat race (New York to Albany and return) of the New York Motor Boat Club will start as usual on Saturday, July 1 at 6 P. M. It is open to all motor boats (excepting automobile boats) under 40 feet over-all length, and having a waterline beam of not less than one-fifth of the waterline length, and enrolled in any recognized yacht club.

The course is from the New York Motor Boat Club House, Hudson River, at 147th Street, to railroad bridge off the Albany Yacht Club House, Albany, N. Y., and return, a distance of 2[illegible] nautical miles.

Entries will close June 28 at 6 P. M. All boats entered must report to the regatta committee at the club house not later than 4 P. M. on July 1. Application blanks and additional information may be obtained from the regatta committee.

From N. Y. to the Thousand Island

(Continued from page 491.)

the starboard bow shortly after 11. We knew then we were safely by Dead Man's Cove. By 12:40 Galloon Light was abeam. In another hour Tibbett Point Light had been picked up with the glasses, and by 2:35 we had drawn abreast of it and entered the mouth of the St. Lawrence. All too soon we came upon Clayton at 4:45 and dropped anchor.

The storm which had been brewing all day broke with terrific force, but we had picked a lee berth in anticipation of it and it passed without causing any damage, and by sundown the sky had cleared.

After nightfall we rigged up a searchlight and found our way to the Murray Hill Hotel, where our cruise was to end. Most of us were obliged to return to town, and after spending a last evening together we boarded the train for home.